AUGUST 1, 1955

STEEL
The Metalworking Weekly

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– page 72

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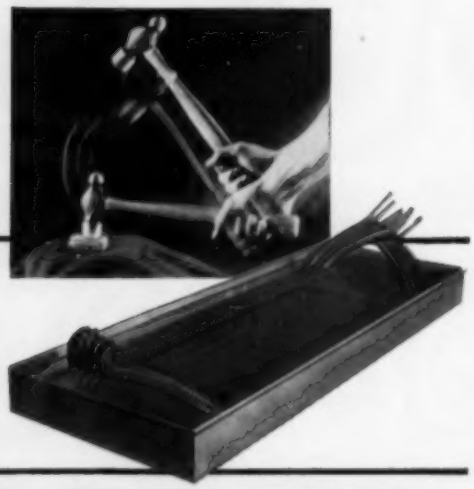
NEW Silco-Flex MOTOR INSULATION

Offers These Amazing Physical Properties

Allis-Chalmers, working with Dow Corning Corporation, has developed *Silco-Flex* motor and generator insulation . . . truly new in concept . . . truly new in effectiveness.

Silco-Flex insulation employs a pure silicone rubber combined with specially developed application techniques to produce an insulation unmatched by any other in use today.



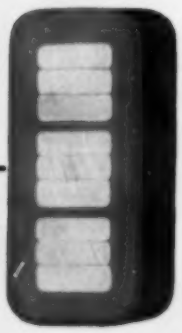
● **Flexibility and Resilience** — *Silco-Flex* insulation remains flexible and resilient indefinitely. It is especially resistant to mechanical abuse and to stresses of overloading, rapid starting and stopping.

● **Moisture Resistance** — Completely sealed, *Silco-Flex* insulated coils are the most moisture-resistant commercial coils ever produced. They are production-tested while submerged in water . . . by far the most complete and searching high potential test used.

● **Abrasion Resistance** — Samples of insulation at right show effects after sandblasting with 90 grit aluminum oxide and 100 psi air for one minute. Nozzle-to-sample distance was six inches, thickness equivalent to 2300-volt insulation. Note difference in abrasion!

Silco-Flex Insulation | Polyester Mica Tape | Asphaltum Mica Tape

● **Homogeneity** — *Silco-Flex* insulation is a void-free dielectric barrier vulcanized into a unified insulating wall. It maintains its homogeneity under extremes of differential expansion and contraction due to thermal cycling.



Other Advantages include exceptionally good thermal stability and chemical inertness. *Silco-Flex* insulation is also a much better heat conductor than ordinary electrical insulating materials. Moreover, enclosures now required to protect windings from moisture and abrasion may be eliminated in many cases.

New *Silco-Flex* insulation is immediately available for all Class H form-wound coils and for Class A and B windings operating under selected service conditions. For complete information, call your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4774

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

(Advertisement)

XI

This is the eleventh of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

How Alloy Steels Are Affected by Molybdenum

There is nothing hit-or-miss about the making of alloy steels. Each element in a given analysis is chosen for its ability to do a special job—or to complement the abilities of other elements. Previously in this series of discussions we have briefly outlined the functions of nickel and chromium. This leads us naturally to molybdenum, a highly reliable performer in numerous types of analyses.

Because of its many desirable properties, molybdenum is one of the most respected of all the alloying agents. It is often used in conjunction with chromium, manganese, nickel, cobalt, tungsten, vanadium, or various combinations of these elements.

Molybdenum promotes hardenability in steel, and is useful where close hardenability-control is essential. It increases depth-hardness and widens the range of effective heat-treating temperatures. Moreover, it has a strong tendency to form stable carbides that hamper grain-growth prior to quenching, thus making the steel fine-grained and unusually tough at the various hardness levels.

Another point in favor of molybdenum is its ability to increase the tensile and creep strengths of alloy steels at high temperatures. Still another is its talent for enhancing corrosion-resistance in high-chromium and chromium-nickel steels.

Among the familiar products that frequently contain molybdenum are high-speed cutting tools, forged crankshafts and propeller shafts, turbine rotors, high-pressure boiler plate, high-pressure cylinders, permanent magnets, and armor-piercing projectiles. This is by no means intended as a complete list, but rather as a few typical examples.

If you would like more information about the properties and applications of molybdenum, Bethlehem metallurgists will be glad to help you. Our staff technicians have devoted years of research to the subject, and working with molybdenum is part of their job. As a matter of fact, they are specialists in all types of alloying elements, and all types of alloy steels. When they can be of assistance to you, please feel free to call them.

And call on Bethlehem, too, when in the market for AISI standard steels, special-analysis steels, or carbon grades. Your inquiries will be welcomed, and we can assure you of prompt service.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

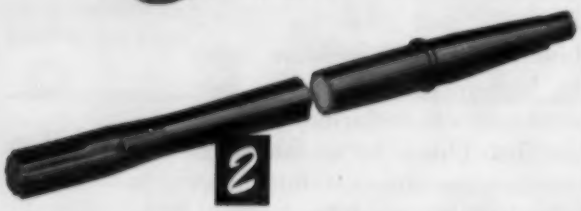
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

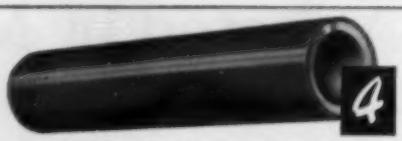
7 WAYS to SAVE MONEY with TOCCO* Induction Hardening

Cost was reduced 94% when heat-treatment of this corn-harvester part was changed from carburizing to TOCCO-hardening, 9½c saved on every piece — $4750 on each 50,000 piece batch, plus an hourly production increase from 120 to 300 pieces per hour.



Leading automotive companies need and use TOCCO hardened axle shafts to handle higher horsepower. Better, yet cheaper—savings of $375.00 per day. Less machining costs, lower priced material, increased production, and a plus in quality—200% greater torsional life.

Kearney & Trecker Corp. reduced the cost of hardening this milling machine part from $1.57 to 10c apiece. In addition TOCCO made possible a switch from alloy to S.A.E. 1045 steel—saving another 11c per piece in material cost. Kearney & Trecker hardens 140 different parts on one TOCCO unit.



Thompson Products Ltd. boosted production of these automotive wrist pins from 500 to 1200 per hour when they switched to TOCCO-hardening. Costs fell from $5.45 to $3.25 per hundred parts—a savings of 2c per pin, $26.40 per production hour.

Mechanics Universal Joint Division of Borg-Warner reports a 69% savings in the hardening of stub ends for propeller shafts. TOCCO also upped production from 35 to 112 parts per hour—over three times as fast as conventional heating methods.

Lima-Hamilton Corporation adopted TOCCO for hardening this shifting lever. Results: a savings of 4c per piece—$25 per production hour. TOCCO costs only 17% of former heating method. This is only 1 of 139 parts TOCCO-hardened by Lima-Hamilton Corp. All show savings over usual heating methods.

7 Number 7—the lucky number—is up to you. Why not add your name to the list of companies who use TOCCO Induction Heating to increase production, improve products and lower costs. TOCCO engineers are ready to survey your plant for similar cost-saving results—without obligation, of course.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-8, Cleveland 1, Ohio
Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name_____
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Company_____
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2 LONGER WARRANTY PERIOD
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3 HIGHER LIFT
—Mast design allows higher standard lift than ordinary trucks.

4 LOWER MAINTENANCE COSTS
—Designed for easier and less frequent servicing.

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6 EASIER TO OPERATE
—Greater visibility... easy-to-work controls.

7 GREATER STABILITY
—Lower center of gravity... higher "stability factor" ratio.

8 BETTER BRAKING
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Write for descriptive literature.

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Baker handling equipment

A Subsidiary of Otis Elevator Co.

6G7

This Small Counter
Does a Whale of a Big Job!...

Added Evidence that —

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For its size . . . *less than one inch square* . . . this Veeder-Root Small Square-Case Counter is the most rugged instrument of its type, with the longest accurate life. And only Veeder-Root makes it this way . . . square all the way through . . . extra strength built-in, with bearing surfaces on *both* ends of the drive shaft.

What's more, this counter is 100% American . . . made by Connecticut craftsmen to unmatched standards of quality and precision. And it's the "counter of countless uses" . . . built into everything from office machines and cameras to taxi meters and voting machines. Now what do *you* make that could count its way to bigger sales and profits with a Small Square-Case Counter built-in as a standard part? Write:

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"The Name that Counts"

STEEL
The Metalworking Weekly

AUGUST 1, 1955
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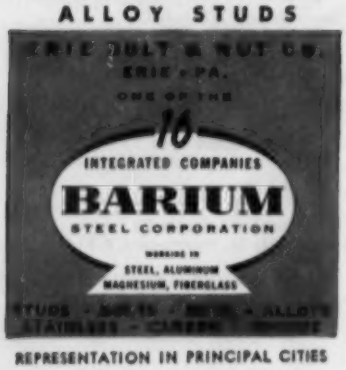


REPRESENTATION IN PRINCIPAL CITIES

behind the scenes

Cracks from Caracas

Maybe it was Percy Bysshe Shelley (how would *you* like to have a middle name like that?) who begged the west wind to scatter his words about the world. He didn't care where they went; just scatter 'em, he said. Well, the editors of STEEL are not so prodigal as Bysshe; they would like to have their words scattered about the world, but they would prefer to have their reports flutter to rest before the eyes of metalworking personnel, particularly the management and supervisory segments.

You'd be surprised how far STEEL flutters about the world. Percy's west wind wasn't one, two, three compared to modern postal systems. Moreover, the widespread desire for information on methods, metals and markets in the world of metalworking transcends planned circulation lists. Let us call to the stand Professor Dusan Zanko, librarian in a Jesuit university in Caracas, Venezuela.

Professor Zanko directs himself to our Readers Service Department, thanks it in advance for the attention he is about to receive and states that his university's collection of STEEL presents some lamentable gaps. He would appreciate receiving the missing copies.

How about that? Our excellent and admirable metalworking weekly setting primly on the shelves of a Jesuit library in a South American university! One might say:

From Caracas in old Venezuela
Wrote a Jesuit monk, "Ah, you fuela
To send us our STEEL—
Thees is torrible deal!
Do you theenk it was lost in the muela?"

Unique Survey

The inventory and delivery situation in steel, copper and aluminum products is reported carefully on page 25. This unique survey, conducted quarterly by STEEL, condenses a world of vital information into a few inches of 9 point type. One of the impressive points about this survey is that STEEL assembles its facts from a pretty consistent 50 per cent return on its questionnaire. Returns are treated confidentially; only averages and aggregates are published. After all, that's how the Kinsey report was handled, too. Unlike that report, however, which was based essentially on bad reports, STEEL's quarterly survey is based on good reports. If your business is geared to any of these metals, better make your next stop page 35.

To Ease Your Eyes

A moment ago we mentioned 9 point type. This was done on purpose, so we could casually bring up the subject of type without appearing to drag it in too abruptly. The conversational gambit would go something like this: Speaking of 9 point type a moment ago reminds us that Art Director Bill Kellogg persuaded management to purchase some new type for STEEL.

"We used to use 30 point Tempo heavy for headings," Kellogg explained, in terms that mean exactly nothing to persons not hep to the printers' jive. "Now we use 36 point Tempo bold condensed. The first was heavier, but you'll notice the second is lighter, rounder and easier on the eye. We consider its use a distinct improvement."

The new type for headings was substituted several weeks ago. If your eyes are stronger and brighter today you can thank W. G. Kellogg.

Looking for a Number

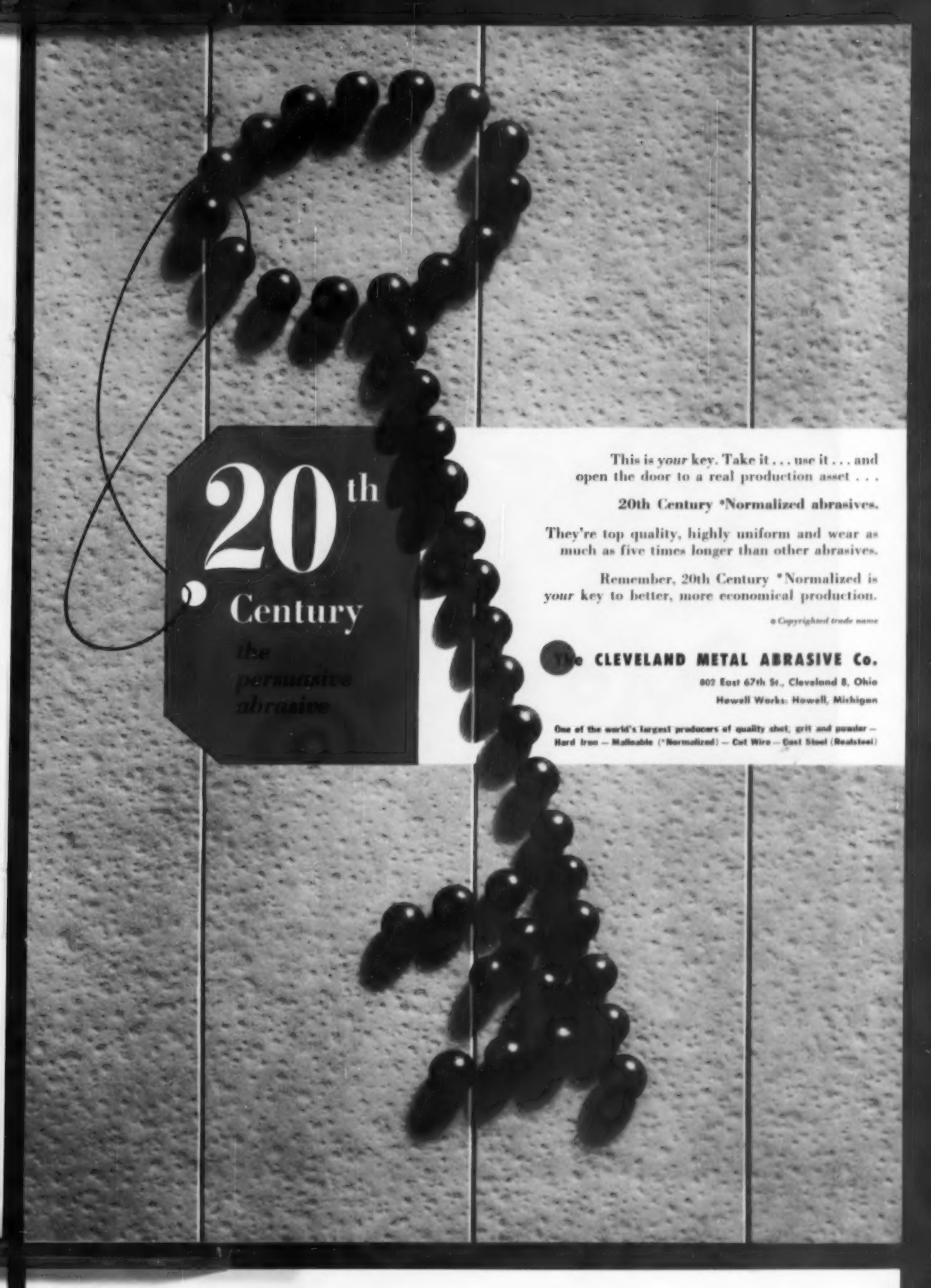
There was no intent to pose as a mathematician on that Einstein deal. The equations were sent in, and we wondered if anybody ever bothered to remember them. They are (and you're welcome):

$$g_{ik,l} = 0;\ \Gamma^{i}_{kl} = 0;\ R_{ik} = 0;\ g,^{\mu}_{\mu} = 0$$

Here's a simple one for hot weather: The integer 844596301 is the 5th power of what number?

Shrdlu

(Metalworking Outlook—Page 29)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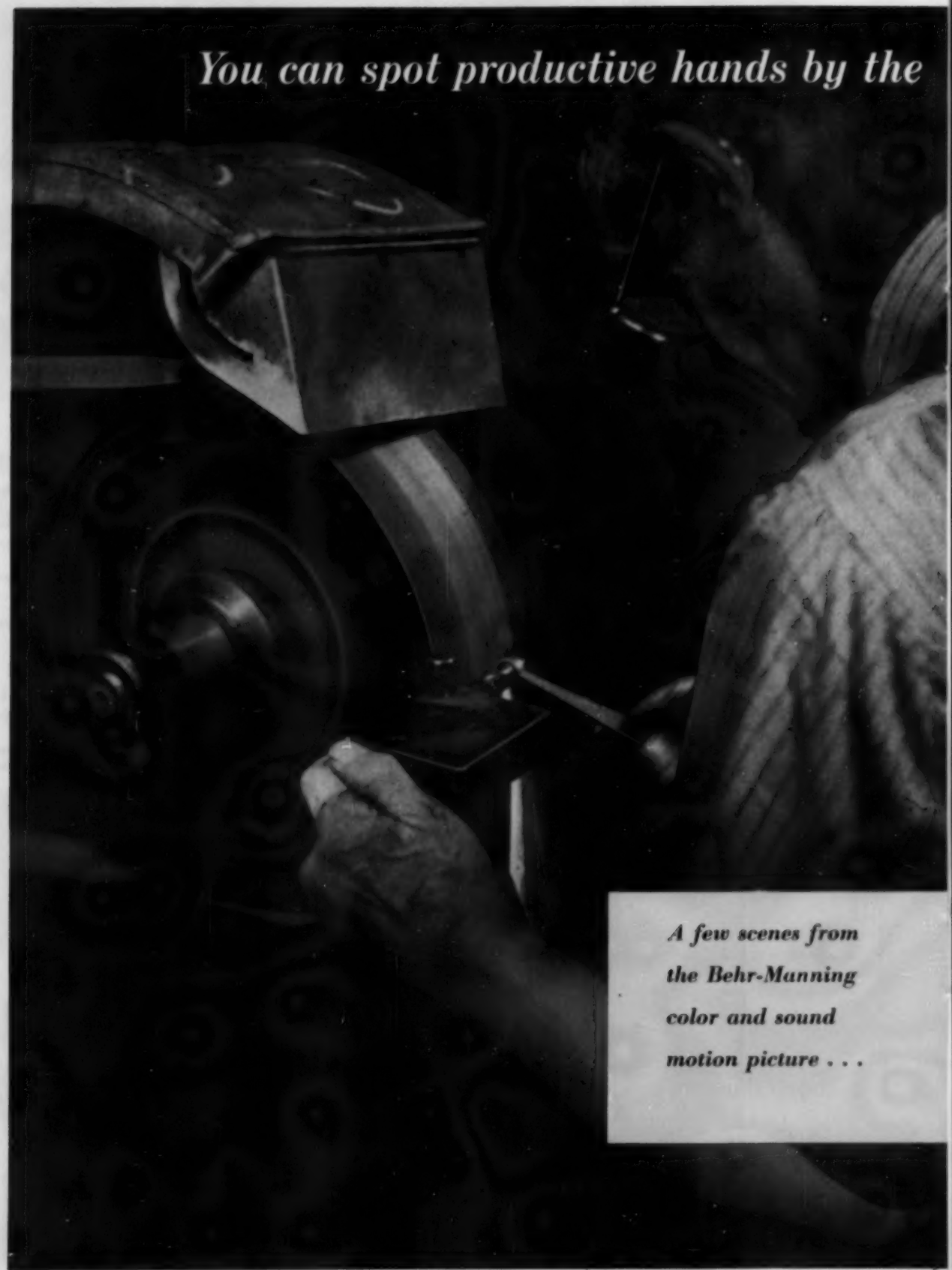
You can spot productive hands by the
A few scenes from
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motion picture . . .

company they keep...

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Contour polishing fluted areas of bits on a 1/2" free-running abrasive belt.

Removing weld bead on tubing with a free-running abrasive belt.

Mirrors for boroscopes are being shaped on this wet abrasive belt grinder.

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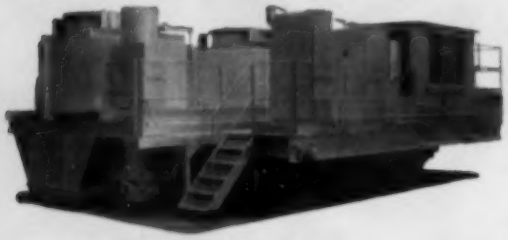
G-7

COAL TO COKE VIA ATLAS CARS

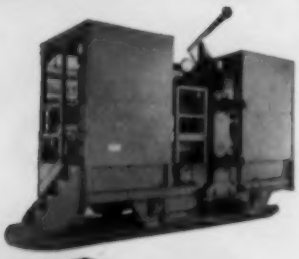
Making coke is a specialized business, and requires special equipment like the cars below. Coke plant operators prefer Atlas Cars because they are dependable.

3 HOPPER COAL-CHARGING CAR

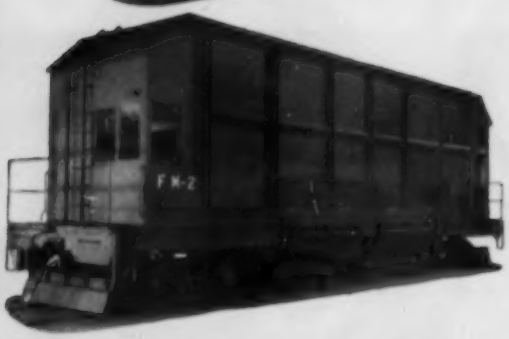


COKE QUENCHER

HYDRAULIC DOOR MACHINE



40-TON COKE TRANSFER CAR



THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Aid to Industry

We value STEEL as an indispensable medium of the entire metalworking industry.

Arthur Folken
Advertising Manager
Stanat Mfg. Co. Inc.
Long Island City, N. Y.

Away We Go?

Your editorial, "Inflationary Bias" (July 11, page 43), refers to the recent increase in steel prices. You say: "How much inflation we have depends on how the increased costs are passed along."

No one wants inflation, but the steel fabricator is hit two ways—first, on the steel increase itself. Second, on wage increases. He has no alternative but to pass on these increases. His competition will regulate any run-away prices.

In our forging industry, we find prices on similar jobs vary greatly, but steel prices are the same no matter where we buy.

The steel fabricator who is caught in the middle when steel goes up needs someone to champion his cause.

Edwin J. Carlson
President
Indiana Forge & Machine Co.
East Chicago, Ind.

Increased Longevity

In the Technical Outlook column of June 6 (page 79), I read of the "Dalton-Dize" process for increasing die life. I want more information, but have been unable to find the address of the Dalton Steel Co. I would be grateful for this information if you have it.

G. L. Clegg
Manufacturing Research Dept. 581
International Business Machines Corp.
Poughkeepsie, N. Y.

● *We suggest you contact Bart McIntyre, vice president, Dalton Steel Corp., 1101 NBC Bldg., Cleveland 14, O.*

Request from Belgium

We are the Belgian representatives of Greenlee Bros. & Co., automatic screw machines manufacturer of Rockford, Ill. We understand from D. E. Hawkinson, company vice president, that a summary of a report he made at the Tool Engineers' show at Los Angeles has been published in the Machine Topics column of Apr. 4 (page 97).

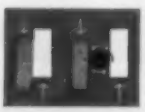
We have not read this article and would appreciate a copy of it. This

(Please turn to page 12)

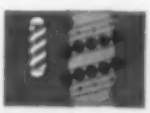
Here's a NEW, FAR BETTER ACTUATION METHOD!

Saginaw ball/bearing Screws assure precision positioning with minimum power, size and cost

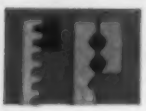
WHAT IT IS AND HOW IT WORKS



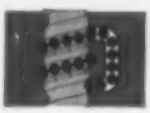
Let's start at the beginning, with the *familiar* principle that there's far less *friction* in *rolling* than in *sliding*. By applying this principle,



Like stripes on a barber pole, the balls travel toward end of nut through spiral "tunnel" formed by concave threads in both screw and mating nut.



the *Safety ball/bearing Screw* radically increases the efficiency of rotary-to-linear motion (and vice versa). Instead of *sliding*, mating surfaces *glide* on rolling steel balls.



At end of trip, one or more tubular guides lead balls diagonally back across outside of nut to starting point, forming closed circuit through which balls recirculate.

TREMENDOUS ADVANTAGES FOR MACHINE DESIGNERS

Conventional Acme screw's efficiency is less than 25%; *Safety ball/bearing Screw's* ranges from 90 to 95%! Combined with electric, hydraulic or pneumatic power source, it forms an actuator with unprecedented capabilities, that:

SAVES POWER—*Safety b/b Screw* requires only 1/3 as much torque for same lineal output as conventional Acme screw. With far lower static break-away, it operates with much less starting and driving power. This permits the use of much smaller motors with less load on the electrical system.

SAVES SPACE—Permits use of smaller motors and gear boxes; eliminates pumps, accumulators, piping, etc.

ASSURES POSITIVE POSITIONING—permits precision control within thousandths of an inch, plus perfect synchronization.

INCREASES DEPENDABILITY—offers longer life and added security of exclusive *multiple circuits*, plus greatly decreased dirt sensitivity of special "Gothic arch"-shaped races.

REDUCES PART AND INSTALLATION COSTS—savings in weight, motor size, power and auxiliary equipment cut cost, too.

UNITS HAVE BEEN BUILT FROM 1½ INCHES TO 39½ FEET LONG

Every *Safety b/b Screw* is individually engineered for its particular application. Our engineers are eager to help solve your actuator problems *now*.

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(or see our section in Sweet's Product Design File)

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We'd like to have you visit us.
And, if you use stainless or alloy steel, brass or bronze fasteners, you'll enjoy seeing America's most modern and most efficient fastener plant.
Let us show you how expert plant layout, automatic materials handling and experienced know-how combine to keep our costs down.
That's why the World's Leading Producer of Stainless Steel Screws can sell you PREMIUM QUALITY AT "MARKET" PRICES.
The E. W. FERRY SCREW PRODUCTS Inc.
Smith Road, Brookpark, Cleveland 30, Ohio

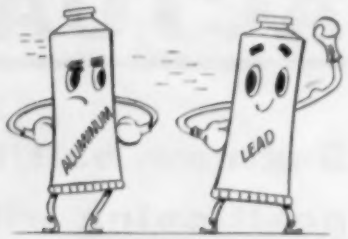
LETTERS

(Concluded from page 10)

is also a good opportunity for us to become better acquainted with your magazine.

J. R. Ponchaut
Etablissements J. R. Ponchaut, S.A.
Houdeng-Goegnies
Belgium

Lead Vs. Aluminum



I noticed in the Nonferrous Metals column of June 13 (page 172) the attractive collapsible tubes chart and the shipment figures, as reported by the Collapsible Tube Manufacturers Council.

In the column, the statement is made that lead "is still the most-used metal" on the basis of poundage. Since the number of tubes used is more significant than the tonnage, it would be interesting to see how aluminum compares on this basis (especially since lead is 4.2 times heavier than aluminum on an equivalent cubic volume basis).

Irving Lipkowitz
Assistant to the President
Reynolds Metals Co.
New York

• *Robert Laflan, vice president of Carl Byoir & Associates Inc., tells us aluminum unit sales are greater than lead unit sales. Gross figures for the first four months of 1955 are: Aluminum, 1,596,279, and lead, 1,010,335 (including tin-coated lead and tin-lead alloy).*

Plastic for Masking

I have read the article, "Shot Peening for Safety" (May 23, page 102), and am interested in the plastic solution used for masking parts prior to shot peening. What is its name and manufacturer?

W. C. Neagley
Metallurgist
Chicago Pneumatic Tool Co.
Utica, N. Y.

• *For this information, contact the plant superintendent, Hamilton Standard Division, United Aircraft Corp., Windsor Locks, Conn.*

Metal Revealing

Where can we secure additional information on the item, "Inside Eye," carried in the Technical Outlook column of May 9 (page 77). It concerns use of infra-red radiation to reveal internal structure of metals.

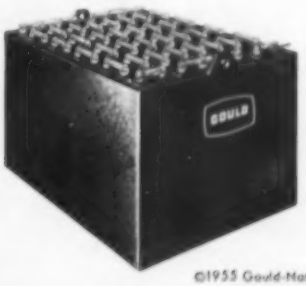
H. P. Kragiel
Stanley Works
New Britain, Conn.

• *Write Dr. William C. Dash, staff physicist, General Electric Research Laboratory, Schenectady, N. Y. He developed this application.*

"Battery Performance is my Business!"

Your Gould Field Engineer has one job—to make sure you get greatest possible service from your batteries. In performing that job he sees to it that your batteries are properly cared for and maintained; he instructs your personnel in systematic maintenance methods; he helps you anticipate battery needs; he makes sure you get maximum battery performance.

Gould Field Engineering Service is nation-wide. Every member is factory-trained . . . has plenty of on-the-job know-how. There's a Gould Field Engineer in your area. He's as near to you as your telephone. Call him. And when you see him, ask him for the new Gould Plus-Performance Plan material for your battery maintenance staff.



America's Finest GOULD Industrial Truck Batteries

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TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

Always Use Gould-National Automobile and Truck Batteries

Sheet Steel is fed into a blanking press and sheared to fender outline.

Smoothly Contoured door panels, each shaped from a sheet of steel, move steadily on conveyors.

Eight-a-Minute—Steel sheets are deep drawn to fender contours in this huge, 450-ton double acting ram press where the cold steel flows evenly under tremendous pressure.

Shapeliness

The New Gives

When you look at the low, smooth-flowing lines of today's automobiles and admire their graceful styling, do you ever wonder how steel becomes so shapely?

The appeal of an automobile's design is far more than just the dream of a designer worked out from the artistic sketches and mock-up models he creates. It is the translation of his clay models by engineers and production men into practical contoured curves of steel sheet.

In the early days, the designer was limited by what steel could do and restricted by his own production equipment.

Today, automation has improved and speeded production. The techniques for making steel have advanced apace. Automakers can draw on the resources of technical know-how and steelmaking facilities equipped with the latest in technological controls, such as the new rolling mills at Pittsburgh Steel Company, for producing hot and cold rolled steel sheet.

So today the designer's range of ideas is becoming increasingly unlimited because better production and new quality in steel are giving

(Advertisement)

Complex Automatic equipment assembles inner and outer door panel where automation speeds production.

Assembled Doors, solidly constructed, yet gracefully styled, are ground and polished for perfect surface.

Fashion In Steel Quality Designers Vast Horizons

In the Showroom and on the road, designer's creation becomes a beautifully practical reality of steel shapeliness.

him ever-widening horizons for the creation of practical new designs. At Pittsburgh Steel this new quality in steel is called shapeliness.

• **What Is It?**—Shapeliness is the ability of steel to be drawn under tremendous pressure to the severest contours of design, while retaining its strength and giving a consistently smooth surface. Beyond that, it must maintain this quality uniformly in sheet after sheet and coil after coil to provide smooth, trouble-free performance on high-speed production lines.

You will quickly grasp the importance of this quality if you will take a look at today's production of sleekly-designed fenders and doors for beautiful new automobile styles.

The sheet from Pittsburgh Steel to provide these shapes has the necessary internal qualities: exact chemical analysis, cleanliness, and fine grain size. And it has the most desired external qualities: uniform dimensional accuracy and surface cleanliness.

It must have these qualifications throughout each sheet and from sheet to sheet as it is fed into powerful, high-speed press operations in order to minimize the possibility of grainy surface, buckles, wrinkles, tears, stretcher strains, or skin breaks.

It is shapeliness, then, that assures a snug-fitting door or fender with a clean, smooth surface for painting . . . one that is attractive on the showroom floor and a stand-out on the road.

• **How It Pays**—Not every steelmaker can produce this quality of shapeliness in steel with the same success. Some, by reason of new equipment and technical experience, can meet the manufacturers' requirements more consistently than others.

If the production of your products requires better than average quality sheet steel, why not explore the opportunities Pittsburgh Steel offers you? Your orders will get personal attention from the time they are entered on the books until your product is completed. A phone call today to the district office nearest you may prove worthwhile.

"Everything New But The Name"

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Write for your copy of the color brochure "The New Pittsburgh Steel Company."

(Advertisement)

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Serving

TUBING CUSTOMERS WITH IMPOSSIBLE PROBLEMS

We realized long years ago that strong loyalties grow in the quality field. To earn its share of that loyalty, TMI is devoted to a two-fold ideal: delivering the finest small diameter precision tubing and learning how to do the impossible.

TMI acquired this know-how with tireless effort, infinite patience, scrupulous care and an engineering appetite for problems no one else wanted to solve. The results justified the effort. In management, designing, purchasing . . . the word among manufacturers of quality products requiring small diameter tubing is easy to remember—"if anyone can do it, TMI can. They have broad shoulders; put the responsibility on TMI and forget your troubles."

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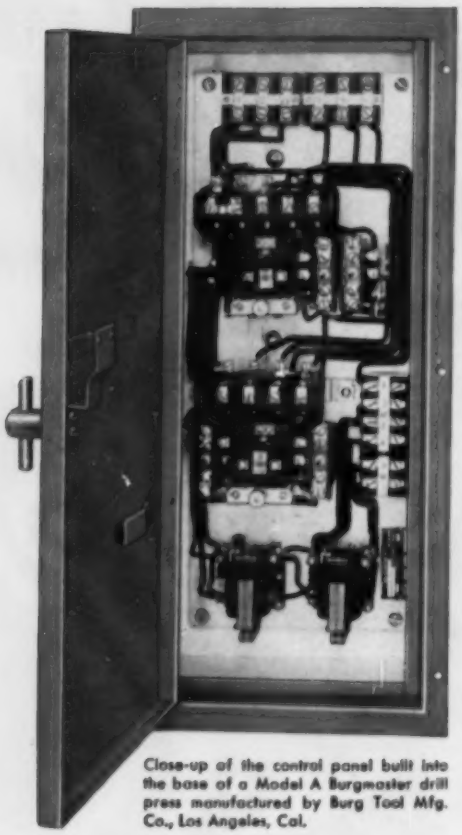
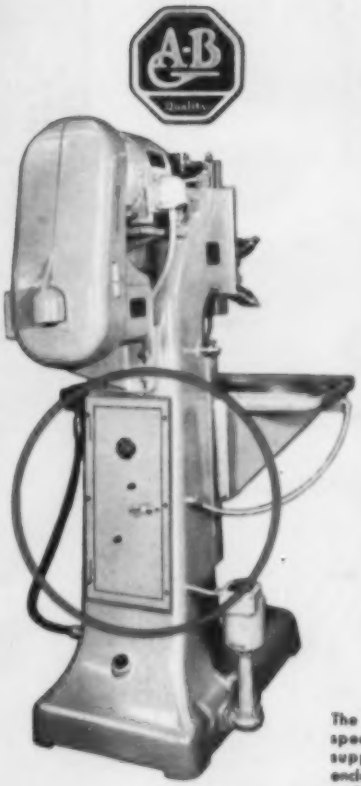


Close-up of the control panel built into the base of a Model A Burgmaster drill press manufactured by Burg Tool Mfg. Co., Los Angeles, Cal.



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QUALITY COMPONENTS for A-B Control Panels

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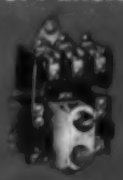

Size 1 Manual Starter

Bulletin 849 Pneumatic Timer

Bulletin 700 Universal 4-pole Relay

Wherever possible, control apparatus ought to be built into the machine frame. The modern, streamlined appearance will appeal to your customers.

See how neatly the Burg Tool Mfg. Co. has integrated the compact Allen-Bradley control panel into their machine pedestal. The panel is assembled from Allen-Bradley standard, catalog listed items known to be good for millions of trouble free operations.

Let us help you add a real sales asset to your machines!

Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.

In Canada—
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Galt, Ont.

7-55-R

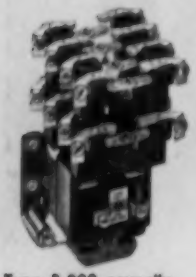
ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

QUALITY RELAYS

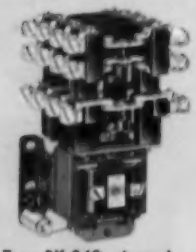
for Long, Trouble Free Service in Critical Control Circuits

Type C-200 A-C 2-pole relay

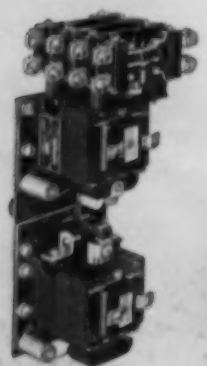
Type B-400 normally open 4-pole relay



Type B-800 normally open 8-pole relay



Type BX-840 universal 8-pole relay



Type BXL-440 universal relay with latch

Type BX-44 Universal 4-pole relay in NEMA Type 1 general purpose enclosure. To change from N.O. to N.C. contacts, or vice versa, just change terminal connections. Max rating—10 amperes.

Here is a line of small relays that is ruggedly built for tough industrial service. The simple solenoid design... with ONLY ONE MOVING PART... guarantees millions of failure free switching operations. The double break, silver alloy contacts need no cleaning, filing, or other maintenance. For complete Allen-Bradley relay data, please write for Bulletin 700.

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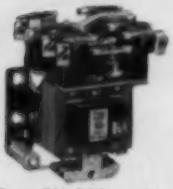
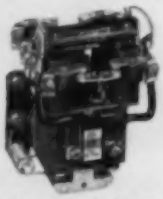
ALLEN-BRADLEY
BULLETIN 700 RELAYS
QUALITY

Type EX-440 D-C universal relay

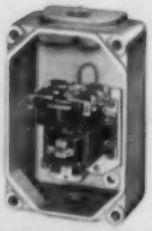
Type BX-220 universal 2-pole relay



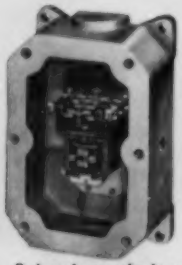
Type BM-200 mechanically held relay



Type BA-20 2-pole thermostat relay



Relay in watertight enclosure



Relay in explosion-proof enclosure

7-55-MR

How a special wire cloth

"wraps up" better crops

● Fanning mill cloth—used in huge machines for grading seeds—must be virtually perfect dimensionally. Even slight deviations in the mesh openings affect the value of seed crops . . . for grading must be *precise* under rigid government inspection.

Like other producers, the *Reynolds Wire Division* of National-Standard had been supplying cloth of bright galvanized wire. Could it be improved upon? After prolonged research with various finishes and types of wire, Reynolds hit on the idea of developing cloth of National-Standard's Copperply* wire for this special use.

Copperply fanning mill cloth, now available, offers remarkable new advantages. Its soft, electroplated copper coating "sets" better, permitting extreme accuracy in weaving and greater stability in use. Slick and bright, it speeds the *flow* of seeds in screening. Finally, its conductivity permits effective grounding to avoid seed accumulation due to static electricity.

Here's only one of many, many examples of how Reynolds undertakes new developments to help customers solve problems and produce *better* products, often at *lower* cost. But problem or no problem, Reynolds customers, and National-Standard customers in general, know the satisfaction, the value, of exceptional service and cooperation. Try us; you'll see.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

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Round and Shaped Steel Wire, Small Sizes

For increased d-c power . . .

N. W. Geist, Rectifier Department Sales Manager, presents one of the new, sealed Ignitron rectifiers, now available in greatly extended ranges. It is the same type used in this metal-enclosed rectifier unit, rated at 1500 kw, 250 volts, for steel mill service.

NOW! GET WESTINGHOUSE SEALED IGNITRONS IN HIGHER RATINGS, COMPLETELY ENCLOSED UNITS

You can now get d-c power conversion for *any* application with the new, higher rated Westinghouse sealed Ignitron rectifiers. These Ignitrons, through the entire load range, have a clear-cut efficiency advantage over other forms of conversion equipment.

Westinghouse sealed Ignitrons are basically simple . . . there are no major moving parts; all vacuum connections and indicating equipment have been eliminated. Here is a big bonus in less maintenance, lower operating cost. Tubes are permanently sealed at the factory; replacements can be obtained without delay from stock, insuring a minimum of outage time. Ignitron cubicles are completely preassembled and wired—ready for installation upon delivery.

As a Westinghouse unit substation—with associated dry-type or liquid-filled transformers and a-c and d-c switchgear—the new Ignitron rectifiers are more compact, *require less floor space per kw,* than any other conversion equipment. And, with the grounded, dead-front metal enclosure, all personnel hazards are eliminated.

For further data, call your Westinghouse sales engineer, or write to Westinghouse Electric Corporation, Box 868, 3 Gateway Center, Pittsburgh 30, Pa.

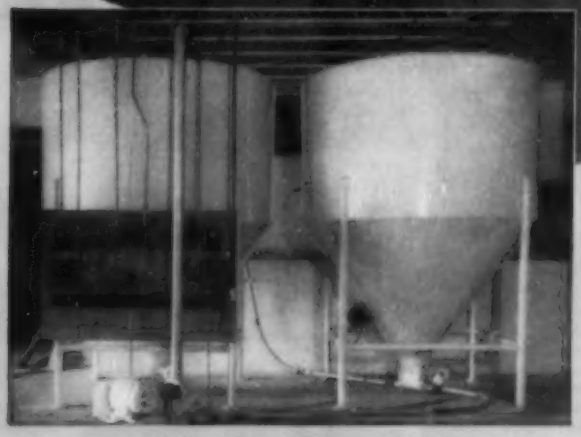
J-10443

YOU CAN BE SURE... IF IT'S

Westinghouse

NO down time

in 16 years



● Flour Storage Bins—each 1000 lbs. capacity

Photos courtesy Century Machine Company, 4344 Marburg Avenue, Cincinnati 9, Ohio

SEE
CINCINNATI
SHAPERS, SHEARS,
PRESS BRAKES
BOOTH 1105

The records of the Century Machine Company show "no down time in sixteen years use" on this Cincinnati Press Brake.

This machine, working a 9½ hour day, forms light gauge sheets in mild and stainless steel up to ¼" thickness. It is constantly producing accurate parts for easy assembly of Century's baking ovens and bakery machinery.

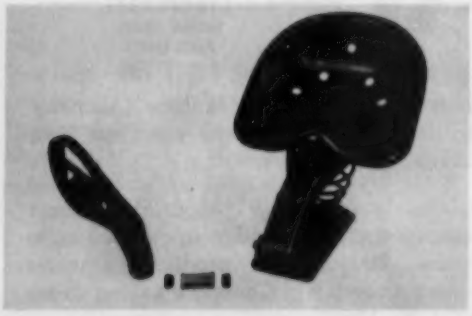
Write for new Press Brake Catalog B-4 describing Cincinnati Interlocking All-Steel construction, Centerline Loading, deep rigid beds and rams.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

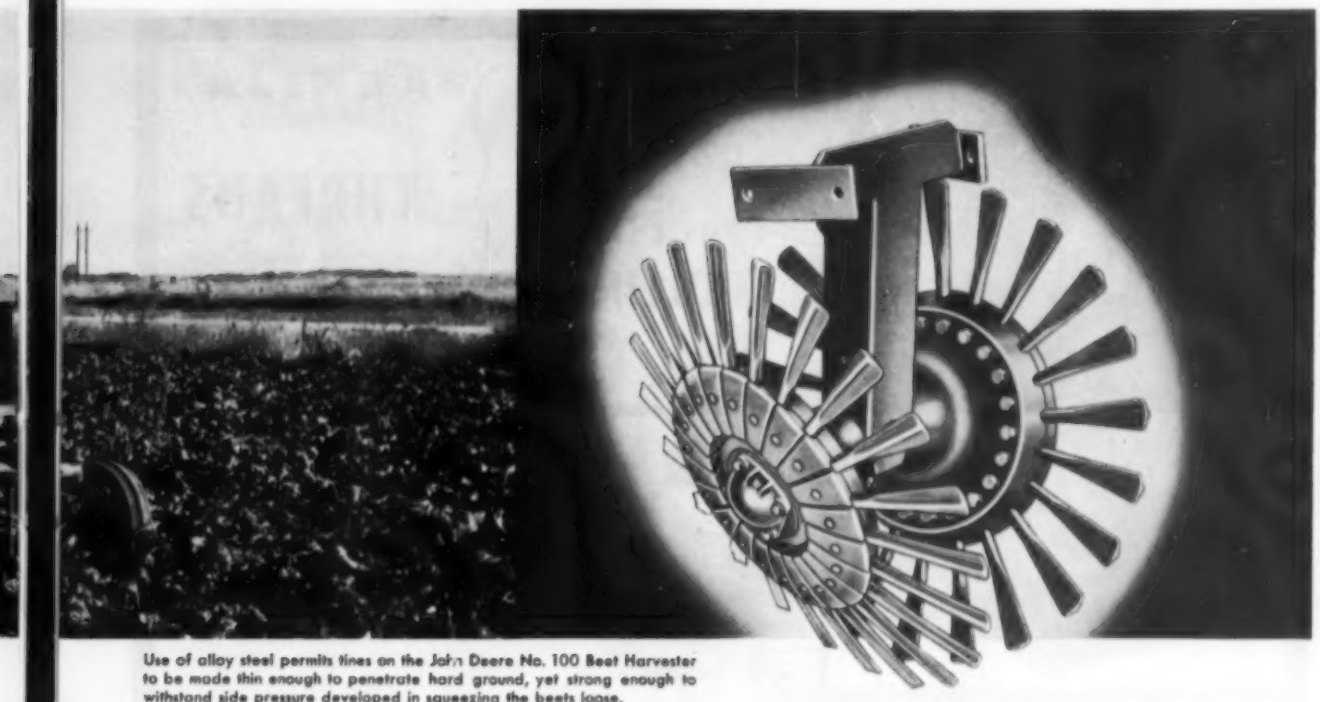
CINCINNATI

HOW ALLOY STEEL HELPS JOHN DEERE BUILD A STRONGER BEET HARVESTER



STRENGTH TO WITHSTAND SHOCK AND TWISTING is provided by Republic ELECTRUNITE Mechanical Tubing in this pilot tube which acts as a bearing for a tractor seat assembly. The tube is flared on each end and rubber grommets inserted. In this application, the tube must withstand constant shock and twisting caused by the uneven surface of furrows and plowed ground. ELECTRUNITE also provides uniform wall thickness, uniform concentricity, and is available with close I.D. and O.D. tolerances. Available in carbon and stainless analyses from Republic's Steel and Tubes Division.

HIGH STRENGTH and fine surface, toughness, hardenability, close tolerance, accuracy of section are cost-cutting qualities you can take full advantage of in steel parts production. Cold Drawn Alloy Bars supplied by Republic's Union Drawn Steel Division give you all six of these properties — plus UNIFORM MACHINABILITY. That's why so many manufacturers have come to Republic with their machining problems. Republic metallurgists and machining experts are always ready to help uncover the answers to tough cost and production problems. Write for information, there's no obligation.



Use of alloy steel permits tines on the John Deere No. 100 Beet Harvester to be made thin enough to penetrate hard ground, yet strong enough to withstand side pressure developed in squeezing the beets loose.

Field experience during the 1953 sugar beet harvest indicated that strengthening of the beet digger tines on the John Deere No. 100 Beet Harvester was necessary to prevent bending.

A change in the shape of the tine or tooth accomplished part of the strength increase. Deere's Engineering Department also felt that by increasing the surface hardness of the tooth, its performance would be improved.

But it was not possible to go to a higher hardness on the carbon steel previously used because the tines became so brittle that they would break under stress. So Deere switched to alloy steel, of which Republic is a supplier.

By taking full advantage of the superior strength and hardenability of alloy steel, bending and abrasion problems have been eliminated. The tines are 24% stronger than those previously made from carbon steel, and without loss in toughness or wearing qualities. Field experience in the 1954 harvest indicates that the alloy steel tine is completely satisfactory and has a much better service life than the previous types.

Alloy steels provide an outstanding combination of qualities essential to designing smaller sections to carry heavier loads with no sacrifice of strength or safety. They resist fatigue, shock and stress. They respond uniformly to heat treatment, producing hard, wear-resistant surfaces around tough cores.

Perhaps you have a problem involving one or more of these factors. Republic—world's largest producer of alloy steels—offers you metallurgical and engineering assistance to help you get the most from alloy steels at the lowest possible cost. Mail the coupon for complete information.

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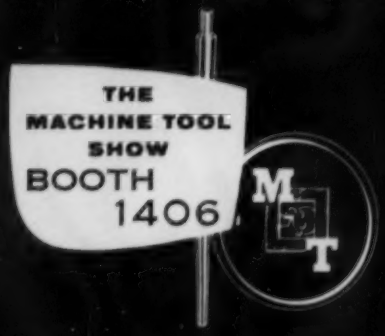
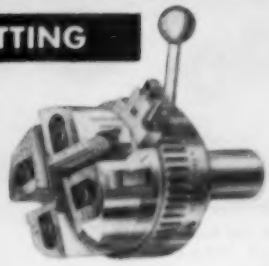


CUTTING
GRINDING
TAPPING
ROLLING
THREADS

CUTTING



The 8C LANDMACO—one of five *new* Thread-Cutting machines to be demonstrated. These machines are designed for precision threading of workpieces from 3/16" to 6⅝" in diameter. Above is the new 2" LANDMATIC —one of the many Standard and Special Thread-Cutting Heads on display designed for application to Automatics and Turret Lathes.

GRINDING

The CENTERLESS Thread Grinder — to be shown in operation — for infeed and thrufeed grinding of threads from 1/16" to 4" in diameter at mass production rates.

TAPPING

The LL Collapsible Tap for producing internal tapered threads featuring detachable heads for wide range coverage. On display will be Rotary or Stationary Standard Taps for straight or tapered threads, Solid Adjustable Taps, Valve Taps, and Taps for other special applications.

ROLLING

The *new* LANHYROL Thread Rolling Machine — shown in a variety of demonstrations—revolutionary in its output, accuracy, and flexibility. Above is the #20 LANROLL Attachment—one of five sizes of Thread Rolling Attachments for Automatics and Turret Lathes to be displayed.

441

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

CALENDAR
OF MEETINGS

Aug. 15-17, Society of Automotive Engineers Inc.: West coast meeting, Multnomah hotel, Portland, Oreg. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Aug. 22-23, Stanford Research Institute and National Industrial Conference Board: Symposium on electronics in automatic production, Sheraton-Palace hotel, San Francisco. Information: National Industrial Conference Board, 247 Park Ave., New York 17, N. Y. Secretary: Herbert Briggs.

Aug. 24-26, West Coast Electronic Manufacturers Association: Western electronic show and convention, Civic Auditorium, San Francisco. Information: WESCON, 344 N. LaBrea Ave., Los Angeles 36, Calif.

Aug. 28-Sept. 1, National Association of Furniture Manufacturers: Furniture supply fair, Conrad Hilton hotel, Chicago. Association's address: 666 Lake Shore Dr., Chicago 11, Ill. Secretary: John M. Snow.

Aug. 31-Sept. 26, World's Fair of Power: S. Lake Shore Dr. adjacent to Soldiers Field, Chicago. Sponsor: General Motors Corp., General Motors Bldg., Detroit 2, Mich.

Sept. 5-6, American Machine Tool Distributors Association: Annual meeting and show, Blackstone hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 6, Pa. Secretary: Thomas A. Fernley Jr.

Sept. 6-8, Industrial Truck Association: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Association's address: 526 Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Sept. 6-8, Material Handling Institute Inc.: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Sept. 6-17, Metalworking Machinery & Equipment Exposition: Coliseum, Chicago. Information: Exhibition & Convention Management Inc., 2689 E. Overlook Rd., Cleveland 6, O. General Manager: C. L. Wells.

Sept. 6-17, National Machine Tool Show: International Amphitheatre, Chicago. Sponsor: National Machine Tool Builders' Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 6-17, Production Engineering Show: Navy Pier, Chicago. Sponsor: National Machine Tool Builders' Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 9-11, Metal Powder Association: Fall closed meeting, the Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 11-14, National Metal Trades Association: Eastern plant management conference, Essex and Sussex hotels, Spring Lake, N. J. Association's address: 123 S. Michigan Ave., Chicago 3, Ill. Secretary: C. L. Blatchford.

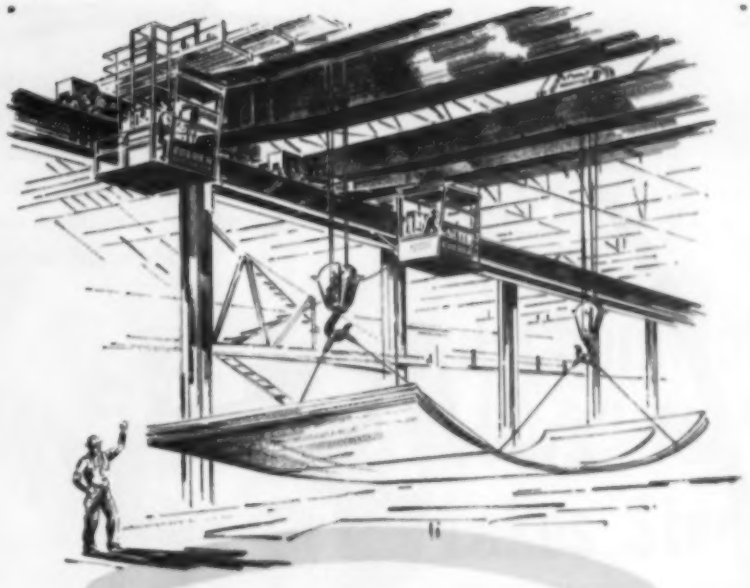
Sept. 11-16, American Chemical Society: Fall meeting, University of Minnesota, Minneapolis. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 12-14, American Road Builders Association: Annual conference of county engineers and officials, New Riverside hotel, Gatlinburg, Tenn. Association's address: World Center Bldg., Washington 6, D. C. Secretary: Eugene Reybold.

Sept. 12-14, Allied Railway Supply Association: Annual meeting and exhibit, Sherman hotel, Chicago. Association's address: P.O. Box 5522, Chicago, Ill. Secretary: Charles F. Weil.

Sept. 12-15, Automotive Electric Association: Fall meeting, the Homestead, Hot Springs, Va. Association's address: 14223 Meyers Ave., Detroit 35, Mich. Secretary: S. W. Potter.

Sept. 12-15, Society of Automotive Engineers Inc.: Tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.



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EDERER has "job-engineered" cranes to the specific requirements of a plant where the work required two cranes with speeds synchronized for "tandem" operation in handling extra heavy loads. Full dynamic controls with adjustable voltage control allow intermediate speeds from 0 to full load speed to be adjusted at any time to suit any operating requirement.

This is only one of the many ways in which EDERER engineers and builds cranes to do any type of work in any industry. Similarly, EDERER can "job-engineer" a crane to the specific requirements of YOUR plant. Our industrial crane catalog can give you more details . . .

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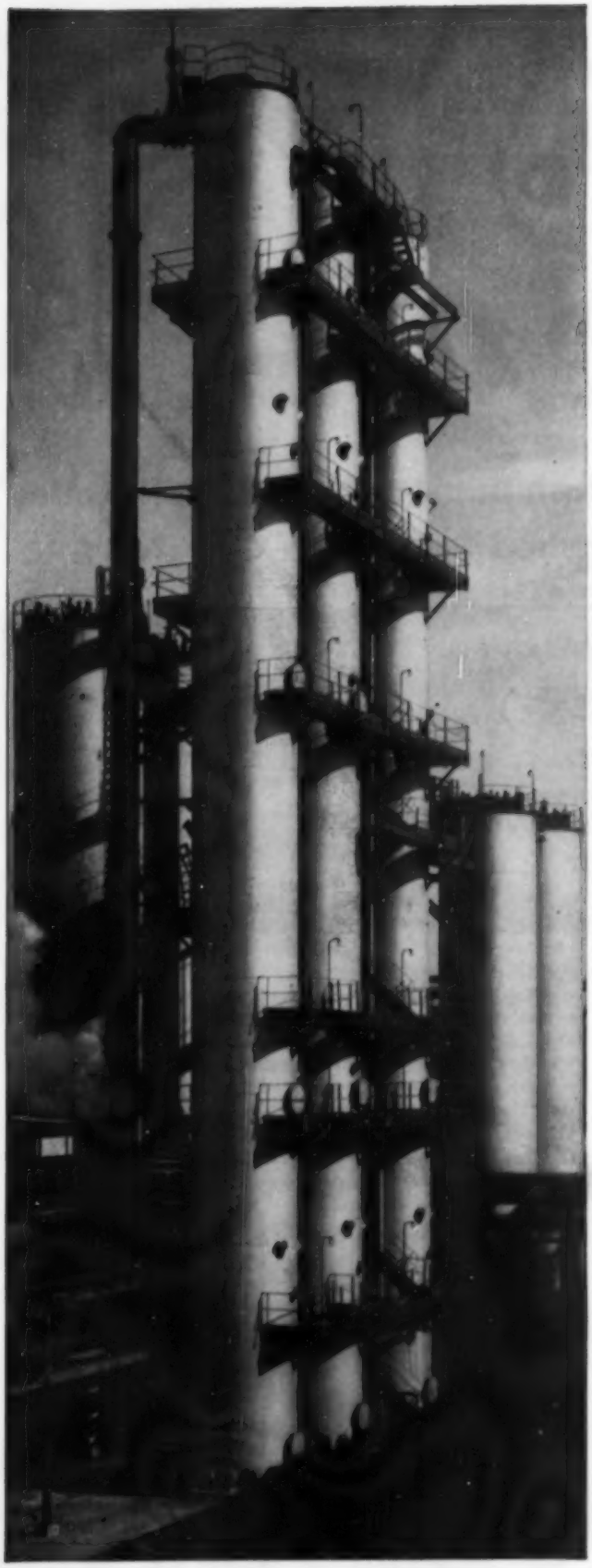

GRAVER

Gas and Chemical "scrubbers" for Great Lakes Steel

(DIVISION OF NATIONAL STEEL CORPORATION)

At Great Lakes Steel Corporation's Blast Furnace Division, a new by-product coke plant is equipped with a total of 25 large examples of Graver's craftsmanship in steel.

These structures, shop-fabricated at Graver's East Chicago plant and field-erected on the site by Graver crews, were built to the designs of Wilputte Coke Oven Division, Allied Chemical & Dye Corporation. These include bins, stacks, gas coolers, tanks for chemical feed, storage, and settling—and scrubbers such as the three 132′ towers shown at the left.

This variety of quality fabrication indicates Graver's versatile craftsmanship—demonstrates Graver's ability to shop-fabricate and field-erect structures for the steel, petroleum and chemical industries. For process and storage equipment in steels, alloys or clads, Graver's offices across the country are staffed with competent engineers ready to serve you.

GRAVER ...craftsmen in carbon, stainless and alloy steels

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SAVED $103.46 PER RING!

Switching to Flash Butt-Welding of Mill-Rolled Sections, Slashed Production Cost 76½%

NEW METHOD

Ring, rolled and welded from mill section of approximate shape of finished part.

OLD METHOD

Ring, rolled and welded from rectangular bar size to maximum overall dimensions of finished part.

Rough rings purchased by a well known manufacturer of jet aircraft engines weighed 135 pounds each. Most of this weight was excess metal which had to be machined away. American Welding's Industrial Products Division, working with this company, studied blueprints and recommended a flash butt-welded ring, formed from a special mill-rolled section. Adopting this new ring saved 88 pounds of metal and eliminated much of the machining time required. American Welding now produces thousands of these rings, in a rough-machined state, at less than one-quarter of the original cost.

Would you like to know more about American Welding and what savings it may help to effect on products which you manufacture? Write today — we will be glad to study your problem.

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Metalworking Outlook

Timetable for Autos

Bulk of the 1956 auto models will be introduced during October and November. One luxury car will come out early in September, and one of the independents won't introduce until December. But the introductions, generally, are earlier than last year's. The move should spur sales and should contribute to pushing production to more than 7 million cars in calendar 1955.

Two Troubles for UAW

The United Auto Workers is in serious trouble. Worry No. 1: The indictment for spending money on politics. Worry No. 2: The defection of some 2000 skilled workers who want to form their own union. The indictment stems from some UAW-sponsored TV shows on which Democratic candidates appeared last year. The splinter movement arises because of the labor contract negotiated with auto companies this year. Skilled workers, less subject to layoff than other employees, aren't much interested in the Supplemental Unemployment Plan.

Steelworkers To Vote

Steelworker President David J. McDonald faces a test on Oct. 25 which he will probably pass, but just barely. Union members will decide whether to go along with Mr. McDonald's choice for the office of international vice president. The vice presidency became the center of dispute last March when a close friend of McDonald's, Howard R. Hague, was appointed to fill the vacancy caused by the death of James G. Thimmes. Opposition came from Joseph P. Molony, who heads the New York district. He will run for the office, presumably against Mr. Hague.

Twilight Zones in T-H

Eight years have passed since Taft-Hartley Amendments were passed to the National Labor Relations Act. You'd think most difficulties would be ironed out, but they're not, according to Guy Farmer, chairman of the National Labor Relations Board. Among many, these five twilight zones haven't been clarified: 1. Can an employer insist on a contract provision limiting the union's right to strike by conditioning it upon an employee vote? 2. Are stock purchase plans subject to bargaining? 3. Can a non-striking union refuse to handle products ("hot cargo") of a company being struck? 4. What rights does an employer have to control the use of his property against labor organizers, etc.? 5. What is the correct interpretation of section 8 (d) of the Labor Relations act? (It has to do with notification of wishes to terminate or modify a contract.)

British Steel Prices Up

British steel prices rose July 25, but they still average 15 per cent under those in the U.S. and on the continent. Increases range from $2.94 a ton

for basic pig iron, now $44.10 a ton, to $12.25 a ton for certain types of alloy bars, which now cost $215.78 a ton. Reasons: Higher costs of coal, ore, scrap, freight rates and general industry wages.

Canada Keeps Pace

Canada's system of unemployment compensation keeps pace with boosts in state jobless pay benefits in the U.S., says Commerce Clearing House. Canadian workers who contribute to the fund may receive benefits up to a maximum of $30 a week for 36 weeks. That compares with the average $32 weekly payment in the U.S. The maximum period in the U.S. is less, ranging from 16 to 30 weeks. In only a few instances in the U.S. do workers contribute to the fund.

AF Buys Foreign Tools

Not much will come from protests of machine tool builders over the latest purchase abroad of equipment by the Air Force. It was following a Presidential directive implementing the State department's policy of doing business, where possible, with friendly foreign countries. Involved are 45 radial drills from a British producer and some shapers built by an Italian firm. The British bid was 19.5 per cent less than the lowest American bid. The price on the Italian shapers was about half the lowest American price.

Challenged on Cost

Trade associations are alarmed at proposed revisions in Section XV on costs of the Armed Services Procurement Regulations (ASPR). Aircraft Industries Association objects because the Pentagon disallowed incentive compensation as cost. It also points the finger at the strange provision that would disallow research expense when more than 25 per cent of the contractor's business is with the government. A company with only 24.99 per cent of its business with the government could charge research as an expense.

Manpower for Power

"The largest problem in atomic power today is that of technical manpower." So says Louis H. Roddis Jr. of the Atomic Energy Commission's staff. In 1947, not over 50 people in the U.S. were working on atomic power. Today, there are some 5000. That seems like a dramatic increase, but it's still inadequate, says Mr. Roddis. It's only 1 per cent of the number working in all research and development, less than 10 per cent of the researchers in the chemical industry and less than 5 per cent as many as in the electrical industry.

Straws in the Wind

Some 700 more apprentices were registered at the end of the first quarter than at the beginning . . . Commonwealth Edison Co. has awarded a $45-million contract to General Electric Co. to build a nuclear power plant . . . The CIO electrical workers have demanded GAW from GE . . . The cost of living rose 0.2 per cent from mid-May to mid-June.

A word about

the Steel Situation

You may be wondering what new supply problems you will have because of the recent set-back in steel production. Strike-loss estimates run to nearly a million tons—and even before the strike, spot shortages had already been created by high demand.

In this emergency period, as always, Ryerson stocks undoubtedly can help you. Thousands of tons of certified quality steels are on hand at your nearby Ryerson plant—carbon steels, alloys, and stainless—and our stocks are being built up daily. In the few cases where the exact kind or size you need is not available locally we will check stocks at our 15 other plants for you.

Remember too that when you order from Ryerson you not only have the world's largest reservoir of steel stocks to draw on, but also the advantage of our long experience, unequalled facilities, and complete dedication to quality of product and service.

So for help on emergency or regular requirements—call your nearby Ryerson plant today.

PRINCIPAL PRODUCTS IN STOCK

BARS, CARBON STEEL—Hot rolled and cold finished—rounds, squares, hexagons, etc.

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Welding and forming quality, abrasion resisting, E-Z-Cut, flange quality, safety plate, etc.

SHEETS & STRIP—Hot and cold rolled, many types and sizes, cut to exact sizes.

TUBING—Seamless and welded mechanical and boiler tubes, hydraulic tubing, etc.

ALLOY STEEL—All types including leaded alloys.

STAINLESS—Allegheny metal bars, plates, sheets, pipe, tubing, fittings, etc.

BUILDING PRODUCTS—Reinforcing bars, spirals, bar joists, wire mesh, etc.

MACHINERY & TOOLS—For metal fabrication.

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Cold Rolled • Hot Rolled • H.R. Pickled
Galvanized • Long Terne
Standard or Production Sizes
Sheared or Slit to Actual Working Dimensions

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DETROIT STEEL REPORTS

DSC STRIP PERFORMANCE
on TOTAL shipments from Jan. 1 through May 31, 1955

99.387%

During this five month period our two strip mills at Detroit, Michigan and Hamden, Connecticut shipped millions of pounds of Cold Rolled Steel Strip and Flat Cold Rolled Carbon Spring Steel.

Taking our total shipments as 100%, here's what the performance box score means:

for every 100,000 pounds shipped—99,387 pounds fulfilled customer expectations; rejections for all reasons averaged 613 pounds.

Because the results are stated as averages, an occasional lot of strip may have been "off" a bit more. As against that, the great majority of shipments were right-on-the-button in meeting customers' requirements.

These requirements represented just about every specification in the book, including split-hair thickness tolerances, special tempers, etc. The variety of jobs ran the gamut of stamped and roll-formed products from comparatively simple ones to some of the toughest.

Why not talk over some of your own strip requirements with a DSC Customer Representative? We'll welcome the chance to work with you . . . and that goes for any of our products.

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Cheers and Smears

Under Pericles, ancient Athens reached its greatest prosperity. The man was noted for his integrity, honesty and profound patriotism. But some of his reforms offended Athenians. He was investigated, fined and subjected to other indignities. Soon thereafter, when Athens was threatened with war, he was recalled, made ruler and given a free hand.

Crowd psychology hasn't changed much in twenty-four centuries. Through two world wars and several lesser emergencies, Washington has followed the same script:

It sends out urgent calls for businessmen to come to the capital and get the ball rolling on defense production, allocation of scarce materials, price control and similar problems. Industry responds by sending top executives who are able to untangle the mess with speedy solutions. They are men who are sorely needed in their own jobs. They undergo the inconvenience of being away from home, working long hours under often difficult conditions and being frequently frustrated by government red tape.

They do a good job. They are cheered for their self-sacrifice and efficiency.

After emergencies subside, the curtain goes up for the second act:

Businessmen who serve without compensation are investigated by congressional committees or bureaus. They undergo character assassination. They must defend themselves against vague charges that they used their official positions for private gain.

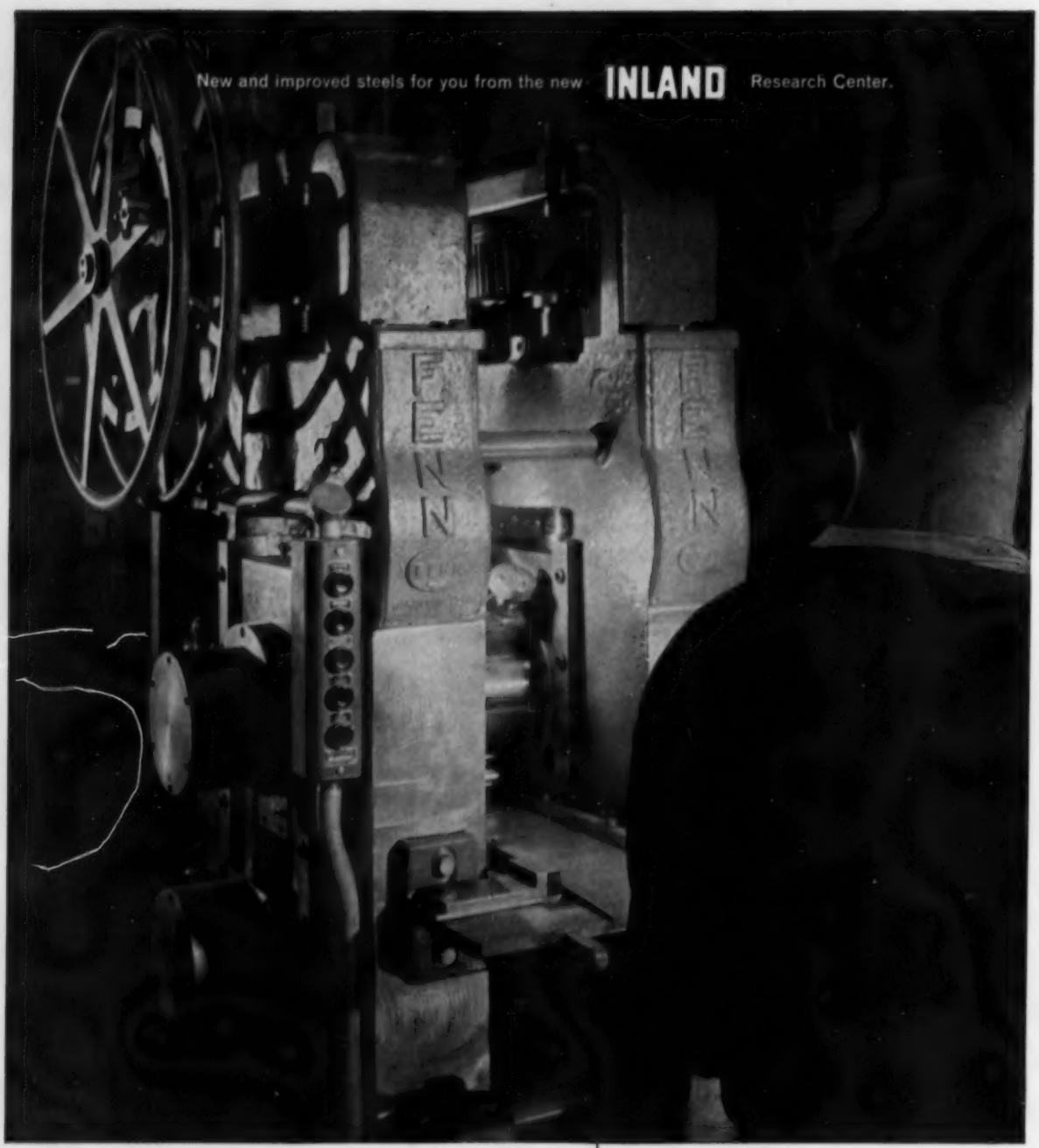
Charges are seldom, if ever, substantiated. Investigators find the men who serve without compensation do an effective and honest job. But the indelible stamp of suspicion remains.

We fear that it is a dual threat to national security: First, it may make the job of recruiting able executives for government service more difficult in the next emergency; second, it imperils the administration's plan to create an executive reserve with industrial know-how and Washington experience.

This plot of cheers and smears is one which the business community resents.

Walter J. Campbell

MANAGING EDITOR



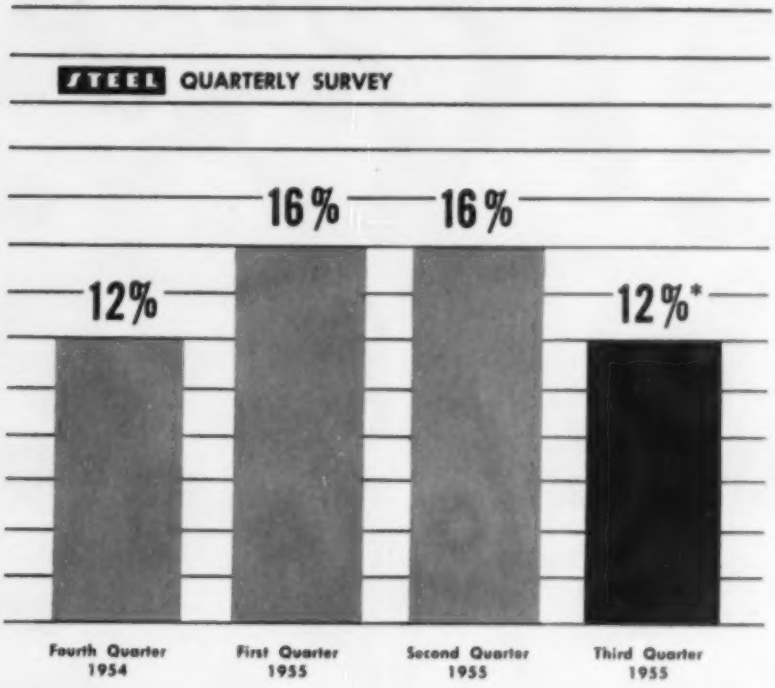
THIS PINT-SIZE ROLLING MILL MAY SAVE YOU KING-SIZE HEADACHES (AND MONEY TOO!)

At Inland, "new ideas" are considered as vital a raw material in steelmaking as top grade iron ore and coal. Establishing reserves of this basic ingredient is a continuing job for Inland's research and development people. The new Inland Research Center in Hammond, Indiana, where Inland researchers look for better steels and more efficient ways to make them, is the most recent addition to Inland's "new idea" resources.

INLAND STEEL COMPANY
38 South Dearborn Street • Chicago 3, Illinois
Sales Offices: Chicago • Milwaukee • St. Paul
Davenport • St. Louis • Kansas City • Indianapolis
Detroit • New York
Principal Products: Sheets • Strip • Structural Shapes • Plates • Bars • Tin Mill Products • Rails and Track Accessories • Coal Chemicals

Steel, Copper, Aluminum

(% of respondents who added to inventories)



Survey includes: Steel products (bars, strip, sheet, plate, structural shapes, wire, tubing), pig iron, copper and brass mill products, copper wire and cable and aluminum products.
*Preliminary

Inventories Shrinking

"WE HAVE been getting steel on about a week's notice for the past month" was a comment made one year ago in STEEL's quarterly survey of steel, copper and aluminum.

How times have changed! In the latest roundup, one user reports: "Mill deliveries have been rescheduled and now represent from 90 to 120 days from date of order."

Troubles—Over-all, 36 per cent of the steel, copper and aluminum users surveyed report that deliveries are unsatisfactory. Three months ago, 24 per cent commented that way. In most of last year, the figure was only 1 or 2 per cent. In this quarter, like the last, about 70 per cent note troubles on one or more items.

"Deliveries seem to be getting worse week by week," one PA notes. Several smaller companies surveyed feel they are getting the "short end of the stick." It's probably small consolation, but industrial giants are feeling the delivery pinch, too.

A purchasing agent for a division of one large corporation says: "Late deliveries on many individual items and sizes make it extremely difficult to keep efficient production schedules." On the other hand, several smaller companies report "deliveries are adequate on most items."

Disappointed — Inventories are shrinking, with more users reporting stocks in the 10-to-30 day supply level, fewer in the higher brackets. It's not a particularly large change, but the trend is downward, and few metalworking executives surveyed are optimistic that the slide will be arrested in the coming three months. The smallest number this year expect to expand inventories (see chart). Many are disappointed that plans to build in the second quarter didn't pan out. Some 22 per cent expected to wind up the three months with higher stock; only 16 per cent made the grade.

Showing the way things are going: Of the small percentage expecting to add to inventories this quarter, 84 per cent expects it will put them in a better business position; none says it will leave them worse off.

Mixed Reaction—On the other hand, almost half of those seeing lower inventories ahead says it will put them in a poorer position. The other half is divided about 50-50 between those who say lower stocks will leave them better off and as well off.

Among the small percentage (of the total survey) that says they'll be happy with lower inventories, is a small core of optimism that the delivery situation will get better. Those PAs are being forced by extended lead times to carry larger than desired stocks and hope to be able to cut them back if lead times shorten.

Difficulties—As far as individual products are concerned, plates seem to be the main trouble spots, with over 50 per cent of users reporting trouble on deliveries. That's a small increase from three months ago. Structurals are tight with 42 per cent noting difficulty, same as in the previous survey.

Sheet continues in high demand, with about two out five unable to get the kind of delivery they want on hot and cold rolled. The number of users having troubles with galvanized sheets more than doubled. Hot-rolled carbon bars are tighter.

Manganese in Venezuela

Huge manganese deposits discovered east of Upata, Venezuela, are probably among the richest in the world, claims the Venezuelan Ministry of Mines & Hydrocarbons.

The possible quantity of ore is estimated to be several million tons; the content is between 28 and 55 per cent pure metal.

Electrical League of Cleveland

Adequate Wiring: A Five-Year Market

	COST IN BILLIONS*
Rewiring present inadequately wired homes (34 million)	$5.0
Conventional wiring of new homes (1 million a year)	3.0
"Plus" wiring in new homes to bring them to adequate standards	0.5
TOTAL MARKET	$8.5

*Includes materials, labor and profit.
Source: National Adequate Wiring Bureau.

Adequate wiring certifications increase as . . .

Copper Adds More Circuits

A MARKET WORTH $8.5 billion over the next five years: That's what awaits manufacturers of copper wire, appliances and allied products in the field of adequate residential wiring.

The campaign for better wiring has been going on to some extent since the 1920s, but it hasn't been until the last two years that metalworking has put much effort into it. Since then, the market has been snowballing.

Who's Who — Naturally, the chief industries in the campaign are those which will benefit most. Utilities sold 55 billion kilowatt-hours for "convenience" appliances last year and would like to double that figure by 1964 if home wiring will take it.

Appliance makers, who stand to lose business from inadequate wiring or gain from sufficient home circuiting, are behind the movement. They say they should be able to sell 428 million units in the next five years, but only if the wiring is adequate. They sold only 353 million appliances in the last five years.

Makers of generating equipment, such as Allis-Chalmers Mfg. Co., have boosted the promotion because they see heavier sales of heavy equipment as better wiring increases consumption of power and forces an expansion of generating capacity.

Real Payoff—The net result will be bigger markets for copper wire, which is the reason Kennecott Copper Corp. and Anaconda Co. are promoting better wiring. Neither makes wire itself, but they sell copper to subsidiary or independent wire mills. Copper is in short supply, but these producers are looking to the long range market. It is estimated that there will be 248 million kilowatts of additional generating capacity by 1975. That will require 700 billion feet of wire to handle the power efficiently, not counting the wire that will go into the motors of the 428 million appliances expected to be sold over the next five years.

The present campaign is almost wholly directed at the homeowner and is a two-pronged attack: Existing homes and new construction. The National Adequate Wiring Bureau, New York, estimates that of the 45 million wired homes today, 34 million have less than minimum wiring to handle the requirements of modern living. In 1930, when many of these homes were built, there were only 19 appliances on the market. Today, there are 56.

New construction probably will continue at the 1-million-a-year pace over the next five years. The goal is to put adequate wiring, which is more than just "conventional" wiring, in each of these homes in the next five years.

Successful Attack—Both fronts have struck pay dirt, but it is much easier to measure the results in new construction. The adequate wiring bureau keeps a record of the number of certificates (like the one above) awarded to contractors. The 12 months ending in June, 1955, showed an increase of 86 per cent over the previous 12 months, and the bureau expects that rate to increase.

But statistics cannot begin to account for the improvement in homes not certified. The competitive edge of builders adhering to adequate wiring standards has forced other builders to raise their standards.

Second Fiddle — Modernization has been slower to catch on. Since World War II, good contractors have preferred to work on new, clean jobs rather than tackle rewiring jobs. But because this field has the greatest potential, it is being cultivated heaviest at present. Makers of appliances, such as air conditioners, are becoming alarmed by the number of units returned to the salesroom because they won't run on the wiring in the customers' homes.

This market is paying off. Twenty-three utility companies with modernization campaigns report they have done almost $3 mil-

lion worth of rewiring, mostly in the last 18 months. The bureau feels that for each job reported, there may be at least three not reported.

Long Way To Go—The copper people feel the campaign is barely off the ground. Yet they can trace positive results. Anaconda says the response to its promotion has been far greater than anyone anticipated. In the last two years the company has sent out over 1 million pieces of direct mail for 800 contractors in co-operation with 100 utility companies and 100 distributors of electrical equipment.

Kennecott reports similar success. With such interest stemming from the consumer level, the companies know they aren't wasting their efforts. The result: A continued strong demand for copper from the wire and appliance industries.

Scrap Exports Too High?

Steel mills say exports of scrap in the first half were too high; export dealers disagree.

The facts: Exports of scrap iron and steel in the period totaled 2,408,789 gross tons (not including shipments to Canada and Mexico). This was about 6 per cent of the scrap used domestically.

All last year only 1,111,417 gross tons were shipped overseas.

Exports to Canada and Mexico are generally considered as a part of the domestic market. The shipments are not large, totaling only 282,227 tons in the first half of 1955. Total shipments last year were 242,317 tons.

The matter is in the hands of the Bureau of Foreign Commerce. Look for it to be influenced by a survey of the country's potential supply of metallics for iron and steel production. It's being made by the Iron & Steel Division, Business & Defense Services Administration.

The division meets with its iron and steel scrap task group this week. Survey results are due this month. Meanwhile, the Bureau of Foreign Commerce continues to require scrap exports to be licensed, although there is no limit on quantity.

By using school techniques, presenting all data . . .

GE Sells with Facts Forum

A DIFFERENT APPROACH to industry selling—one that brings products and customers together in an informal atmosphere minus sales pitches—is getting a warm reception from metalworking and machine tool people in Cleveland.

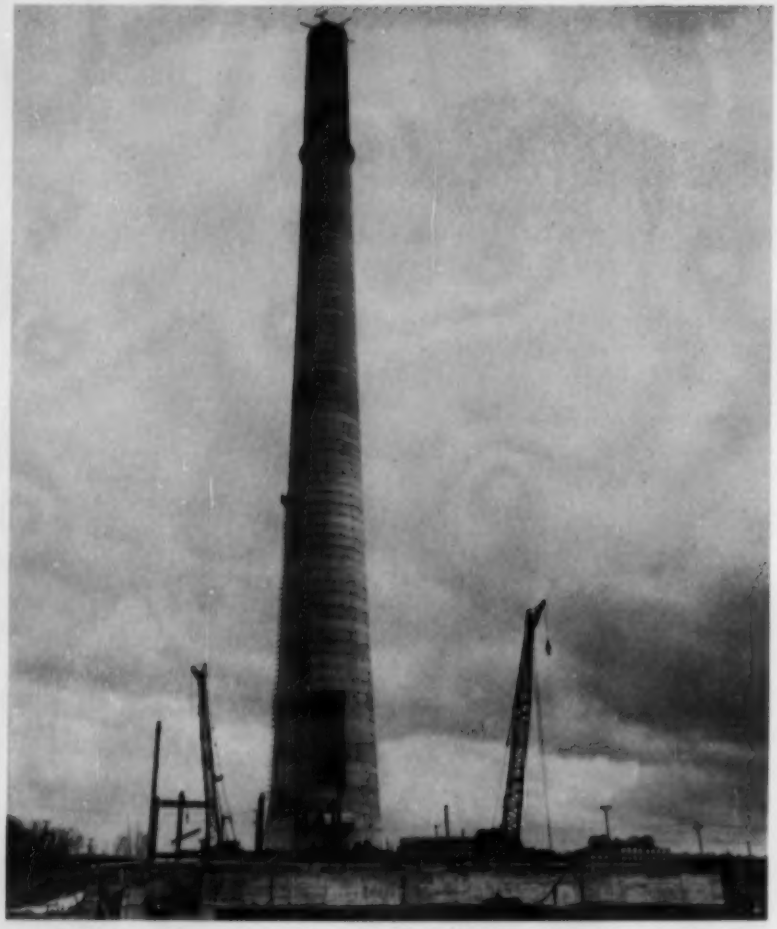
It's an idea of the local apparatus sales organization of General Electric Co. Groups of customers are invited to a classroom-like display room. Amidst operating samples pertinent to the group, both sides take a fresh look at specialized electrical problems and how to solve them.

Some Skeptics — When the "Facts Forum" was at the talking stage, some doubted that it could entice busy men to leave their work for the better part of an afternoon. "That has been no problem," according to C. J. Miller, manager of component and intermediate distribution sales. "So far it has been harder to get them to leave at the end of the day."

The forum brings together products manufactured by 14 of GE's apparatus departments.

No Distractions — One of the hidden beauties of the system is that it gets the customer away from his office. After noncommercial talks by GE sales engineers, the meeting breaks up into small discussion groups around the displayed apparatus.

"In the few weeks we've been at it," confides a sales engineer, "we've learned a lot from our customers and have incorporated many of their ideas into the forum."



INCO builds iron ore processing plant near Copper Cliff, Ont.

Canada: Trendlines Are Up

Business setbacks of 1954 are disappearing as demand for base metals, lumber and manufactured goods brings industry expansion, new jobs and a revived consumer market

MINING AND CONSTRUCTION are playing major roles in Canada's economic upswing.

Mining has parlayed strong export demand with stepped-up domestic requirements to boost its 1955 level some 13 per cent over last year's. New deposits also are in production.

Construction is shooting for a record year. Contracts awarded by the end of April were up nearly 40 per cent over 1954's. Bolstered by over 1000 more residential starts than in the first quarter of last year, an earlier Canadian government survey prediction (outlay for new construction in 1955: $4 billion) is coming true. This will give construction a 10 per cent gain over 1954. Housing starts will total 116,000.

Exports, Too—Not to be forgotten in the general upsurge is a 12 per cent increase in exports during the first four months of this year. Those to the United Kingdom rose $80 million, or 46 per cent ahead of the same period a year ago. Exports to the U.S. were up $55 million—an 8 per cent gain.

Manufacturing industries showed only small gains in the first two months of 1955. March saw the official government index climb 3 per cent above that month's figure in 1954. Textiles led the parade with a 17 per cent gain. Nonferrous metals, electrical apparatus, wood and paper products improved. May saw a healthy jump in car output. At 58,279 units, it represented a 52 per cent increase over figures for May, 1954.

Bright Spot—There are indications of more production in the machinery, tool and farm implement industries. Demand for steel from them and others is moving up proportionally.

The majority of manufacturers are again building up stocks of raw materials. Production schedules are being expanded. Government statistics show that inventories came up $40 million the first three months of this year in contrast with a decline of $58 million during that period in 1954.

Prices — Wholesale prices have been stabilized. Led by base metals, lumber and iron and steel products, the wholesale price index (1935-1939 = 100) went from 214.3 in October to 218.5 in April. Point of interest: This trend has not influenced the consumer price index.

As winter turned into spring, more "help wanted" signs began to appear. May statistics show that some 5.3 million people were employed—a 2.5 per cent gain over the previous year. While much of the hiring came from the outdoor fields of agriculture, construction and logging, manufacturing firms also began to expand payrolls.

Province Report—In British Columbia, one of the boom areas, manufacturing plants and machine shops have full production schedules. Shipyards are moderately busy. Small boatyards and engine repair shops have finished a good spring season and business activity is still high. Construction shows no signs of weakening.

With an eye to the future, James W. Coyne, governor of the Bank of Canada, predicts: By 1975 Canada's population of 15 million will reach some 23 million. Gross national product, at 1955 prices, will be doubled, meaning a GNP of some $55 billion. And exports will decline from 24 to 20 per cent of the GNP by 1975.

Backlogs are increasing, but competition is keen as . . .

Valvemakers Seek 10% Gain

IF SHORT NICKEL and copper supplies hold out, the valve industry will ship 10 per cent more orders than it did in 1954, reports James A. Dwyer, president, Valve Manufacturers Association.

The total will be about $1.08 billion—a figure which compares with the previous high of $1.02 billion in 1951 when the Korean War was a dominant economic influence.

Kinds—Most common types of valves are globe, gate and check. They are fabricated from gray and malleable iron, steel, stainless steel, brass and bronze. Valves are always "on the job" where the flow of liquids or gases must be regulated.

Standard globe valves often have 10 to 12 components and frequently more than one type metal. Even with one-metal valves, parts like the stem, seat and body may have different metal specifications.

Valvemakers estimate that 20 to 25 per cent of their products go into new construction, with the balance going to maintenance.

Sales — Production is about keeping abreast of orders, but a mild backlog is developing, which is traceable, manufacturers explain, to more orders from distributors that had low inventories at the beginning of the year. When business improved sharply in the first quarter, they had to order heavily. Most valvemakers are able to deliver many sizes and types of standard items from factory warehouses. Special valves may take 60 to 90 days. Government orders are a small portion of today's volume.

Assembly lines are full, but nickel and copper supplies dwindle

Industries calling for new applications and expanded uses of valves include: Chemical, petrochemical, oil and gas, sewage disposal and commercial building. Civilian aspects of atomic power may have great potential.

More Research — Higher pressures and temperatures are the chief engineering problems confronting the industry. Research is under way. There is a trend toward cast steel.

Higher profits haven't materialized even though valvemakers see volume 10 per cent above last year's. Reasons: Increased labor and other costs, more competition and customer resistance to higher prices.

Pipemakers Ask Tariff Hike

American manufacturers of cast iron soil pipe are being victimized by increased imports and unfair competitive practices by producers abroad, charges Cast Iron Soil Pipe Institute, Washington.

Soil pipe imports jumped from 219 tons in 1949 to 5729 last year. In the first four months of this year, the United Kingdom shipped soil pipe to U. S. ports at a rate 47 per cent over last year's.

In 1954, 80 per cent of the imports entered through the Pacific Coast. It costs no more to ship soil pipe by water from Glasgow, Scotland, to Los Angeles than by rail from Los Angeles to Tucson, Ariz.

American soil pipe is being undersold by up to 17.84 per cent, a critical price differential in an industry of tight profit margins.

Homer E. Robertson, executive vice president of the soil pipe institute, says it appears that there has been a violation of the Antidumping Act of 1921. He also charges that the government of Great Britain subsidizes scrap iron to its pipe foundries.

The institute has called for invoking the escape clause in tariff agreements to prevent serious injury to American producers; it says that plumbing jobbers in the Midwest and East already are receiving quotations on delivery of foreign soil pipe by ocean-going freighters to Great Lakes ports when the St. Lawrence Seaway is completed.

Metalworking: First Half Profits Soar

	First Half Net Earnings 1955	1954		First Half Net Earnings 1955	1954
Allis-Chalmers Mfg. Co.	$12,562,932	$13,490,505	Metal & Thermit Corp.	$989,480	$740,922
American Radiator & Standard Sanitary Corp.	8,497,000	7,221,254	Midland Steel Products Co.	2,340,502	910,640
American Steel Foundries	2,352,338	3,085,022	Minneapolis-Honeywell Regulator Co.	7,240,898	7,019,778
Beryllium Corp.	475,823	198,193	National Acme Co.	1,376,761	1,857,771
Carborundum Co.	2,715,950	1,834,516	National Lead Co.	23,503,085	17,569,659
Caterpillar Tractor Co.	15,446,994	12,627,907	National Malleable & Steel Castings Co.	1,030,148	428,380
Central Foundry Co.	609,151	325,000	Packard-Bell Co.	362,131	334,830
Clark Equipment Co.	3,716,765	2,778,850	Pittsburgh Forging Co.	102,324	155,543
Cleveland Cliffs Iron Co.	3,343,206	1,456,332	Pittsburgh Screw & Bolt Corp.	482,416	461,163
Clevite Corp.	2,672,957	1,646,758	Republic Aviation Corp.	9,612,399	4,597,838
Continental Can Co. Inc.	10,289,395	9,131,932	Rheem Mfg. Co.	3,162,982	3,295,819
DeVilbiss Co.	507,807	309,602	Rockwell Spring & Axle Co.	8,681,889	5,692,815
Douglas Aircraft Co.	13,680,622	19,178,939	Signode Steel Strapping Co.	1,562,000	1,011,000
Eaton Mfg. Co.	7,397,402	5,206,031	Standard Forgings Corp.	372,580	172,860
Ekco Products Co.	2,321,071	2,195,678	Stanley Works	2,503,218	2,172,624
Ferro Corp.	1,273,049	866,065	Sylvania Electric Products Inc.	2,840,364	1,401,298
Gardner-Denver Co.	2,087,808	1,297,092	Thompson Products Inc.	6,768,149	6,490,502
General Electric Co.	101,892,000	93,856,000	Towmotor Corp.	701,066	387,398
General Refractories Co.	2,550,389	1,090,926	Underwood Corp.	543,375	280,525
General Steel Castings Corp.	902,586	1,074,190	United-Carr Fastener Corp.	1,903,686	1,068,754
Greenfield Tap & Die Corp.	476,369	260,349	U. S. Hoffman Machinery Corp.	1,206,102	370,163
Harbison-Walker Refractories Co.	3,395,157	1,535,285	U. S. Pipe & Foundry Co.	4,975,839	4,352,739
Houdaille-Hershey Corp.	1,404,891	1,235,661	Westinghouse Air Brake Co.	3,227,911	2,317,916
IBM Corp.	23,870,992	21,600,314	Youngstown Steel Door Co.	610,465	500,104
Jack & Heintz Inc.	962,000	797,300			

METALWORKING companies, across the board, are reporting increased earnings for the first six months of this year.

While a sprinkling of firms did not reach 1954 profit levels, most are record bound. Union Carbide & Carbon Corp.'s net income jumped to $63.6 million from last year's first-half total of $41.8 million. Sales improved 27 per cent and earnings soared to a 52 per cent gain.

Cool Sales—York Corp. had its best single quarter in the June period, racking up a net profit of $1.5 million. Stewart E. Lauer, president, says: "The improvement stemmed from higher sales of packaged products through York's commercial division and contracts for heavier equipment sales."

Other Side—While Allis-Chalmers Mfg. Co. increased its sales during the first half ($258.9 to $267.0 million), its net profit dropped from $13.5 to $12.6 million.

General Electric Co. ran profits up into nine figures. Net earnings were $101.9 million, a 9 per cent increase over 1954's. Sales climbed 5 per cent to $1.5 billion.

George Romney, president, American Motors Corp., reports that the corporation operated profitably during March, April, May and June. He declared a second quarter profit of $1.6 million. Production of 56,036 Nash and Hudson cars in the June quarter compares with 23,476 produced during the same months last year. This has helped to offset losses for the first five months of American Motor's fiscal year (Sept. 30) when Nash and Hudson manufacturing programs still were being consolidated at heavy cost. Net loss for the company for the nine-month period, ending June 30, is $4.5 million.

Other Barometers—The Council of Economic Advisers July report predicts the gross national product will reach $400 billion by the end of the year. The second quarter saw GNP soar to an annual rate of $383.0 billion. Point to remember: Government purchases of goods and services for national security will only be about 10 per cent of this total.

General Motors Corp. had a record number of employees and an all-time high payroll during the first half of 1955, despite a 25 per cent drop in defense sales. Average employment was 635,786.

Coming Back — Monarch Machine Tool Co., coming out from under a 10.5-week strike during the second quarter, suffered losses of $284,850, which compares with profits of $994,300 during the first half of 1954. Jerome A. Raterman, president, says that the future is still bright. "Over 98 per cent of our employees have returned to their jobs, additional people have been added . . .and incoming business continues at a lively pace. Our backlog is at its highest peacetime level."

Metalworking outlook: Previ-

ous sales and profit records will be erased by 1955 totals in hundreds of firms—large and small.

Profits: Four-Year High

U. S. manufacturing profits are at the highest quarterly level in four years, states the *Quarterly Financial Report* of the FTC and SEC. Earnings after taxes for the first quarter of this year are estimated at $3.3 billion, up 29 per cent over the first three months of 1954.

Researchers Needed

Supply of qualified research scientists and engineers falls short of industry's needs

COMPANIES are having trouble carrying out research programs because of a lack of scientific and engineering personnel. A survey by the Bureau of Labor Statistics states that shortages are most severe in the aircraft, electrical equipment, petroleum, paper, food and primary metals industries.

Interviews with about 200 large companies, which employ well over half of the nation's industrial research scientists and engineers, show at least half are unable to hire enough researchers to meet their needs. One out of three companies report major or substantial shortages. Many companies not reporting numerical shortages emphasized their need for better qualified scientists and engineers.

Needs—The situation extends to all levels of experience and training. The greatest need is for personnel with experience or advanced degrees.

Demand exceeds the supply of qualified personnel in a wide range of fields—chemical, electrical, mechanical and aeronautical engineering, chemistry, physics metallurgy and mathematics.

A sizable number of firms have been forced to curtail projected increases in their research and development activities. The research director of a major petroleum company points out that it is a better policy to let positions go unfilled than to drop hiring standards below the high level necessary to obtain effective research workers.

Steel Output, Sales High

	First Half Net Earnings 1955	1954	First Half Sales 1955	1954
Acme Steel Co.	$ 3,395,301	$ 1,970,149	$ 53,338,031	$ 41,245,457
Alan Wood Steel Co.	891,897	445,976	26,362,921	20,089,007
Allegheny Ludlum Steel Corp.	6,415,653	1,891,671	116,842,495	85,285,193
Armco Steel Corp.	28,020,053	19,001,116	329,521,667	267,071,172
Continental Steel Corp.	1,585,098	897,881	23,757,471	19,250,033
Crucible Steel Co. of America	6,285,475	1,312,395	114,829,465	84,555,951
Granite City Steel Co.	5,483,603	1,358,232	55,016,335	33,410,552
Inland Steel Co.	23,419,852	19,417,669	315,030,610	280,065,819
Pittsburgh Steel Co.	2,574,000	318,000	84,623,025	60,690,829
Republic Steel Corp.	41,137,071	24,791,945	570,684,791	432,609,292
Rotary Electric Steel Co.	1,889,895	964,866	26,510,638	15,594,931
Sharon Steel Corp.	4,488,002	644,262	83,636,451	47,972,633
U. S. Steel Corp.	177,877,960	93,851,114	1,968,160,985	1,670,842,389
Youngstown Sheet & Tube Co.	18,006,502	9,070,694	297,032,213	223,463,883

MIDYEAR FINANCIAL reports from the steel industry reveal: Sales and profits are approaching peak levels. Near capacity production will continue through the third quarter.

Reflecting the general optimism of the industry, John N. Marshall, president, Granite City Steel Co., reports: "Our first half results (see chart) represent our initial opportunity to operate recently expanded facilities at high levels; current earnings reflect the benefits of expansion on a co-ordinated basis. We are optimistic about continuing high operations and expect 1955 to set many records.

Another Record—F. M. Gillies, president, Acme Steel Co., says that June shipments amounted to over $10 million, an alltime high for the company.

Republic Steel Corp. operated at 97.7 per cent of capacity in the second quarter. During the second quarter in 1954, its production was 69.9 per cent of capacity.

Inland Steel Co., while reporting new records for production, shipments, sales and earnings for the first half of 1955, is predicting that capacity operations will continue through the third quarter and considers the fourth quarter outlook "bright."

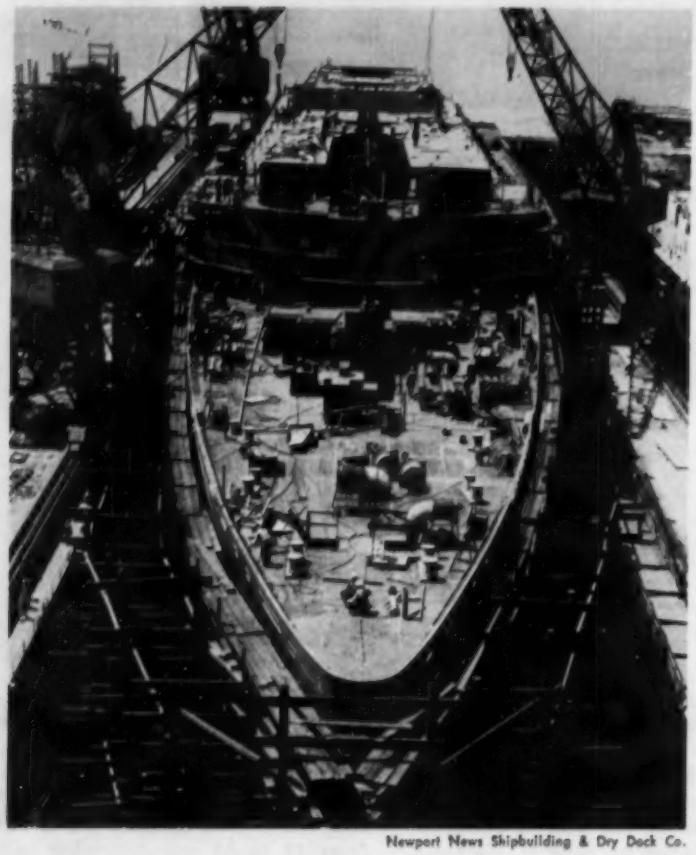
Survey—Meanwhile, the American Iron & Steel Institute is declaring that a 30-year comparison of net profits, based on data published by the First City Bank, New York, shows that the iron and steel industry's net profits usually have been 35th on a list of from 42 to 46 manufacturing industries. Reports compare net profit with net worth.

Completing its fiscal year on June 30, Colorado Fuel & Iron Corp., discloses a consolidated net income of $10.9 million. This compares with a net income for the previous fiscal year of $7.1 million. The steel producing plants operated at 78.3 per cent of capacity. The June quarter rate was 93.7 per cent.

Finishing with a strong second quarter, U. S. Steel Corp. registered the best net income ($177.9 million) since the first six months of 1917 when net profits were $128.0 million. Total for the first half of 1954 was $93.8 million. Shipments of steel products in the second quarter of this year amounted to 7.1 million tons. This is the greatest tonnage shipped during any one quarter.

Outlook for domestic producers: A near capacity third quarter and a better than usual fourth will bring a record year to the steel industry.

By E. C. KREUTZBERG Washington Editor



Newport News Shipbuilding & Dry Dock Co.

Shipbuilding: Full Steam?

THE MARITIME Administration may trigger some $756 million in ship construction and repair work during fiscal '56.

Clarence J. Morse, chairman of the Federal Maritime Board and head of the Maritime Administration, reports that government appropriations on hand or assured call for 85 new ships to be added to America's active merchant fleet and the repair of 189 military auxiliary vessels in the reserve fleet.

Breakdown — Private industry will shoulder about 58 per cent of the total cost—Uncle Sam will pay the rest of the bill. Some $84 million already has been obligated for construction of 15 new ships or conversions.

Estimates for contracts, says the Maritime Administration, call for 53 ships or conversions involving expenditures of as much as $500 million. "The 53 ships represent solid contractual prospects under the present subsidy legislation," says Mr. Morse, "and the Maritime Administration will make every effort to bring the entire 53 to the contract stage."

Suppliers—As about 50 per cent of the money spent on shipbuilding goes for materials, machinery and supplies used in the industry, suppliers can expect better times.

Interest in the roll-on roll-off ships has been spurred sharply by the Army's offer to take the first six of these vessels under a seven-year charter. Six shipping companies also are discussing the possibility of operating 30 of them. If these talks should end in orders, it would bring in an additional $240 million. This amount was not included in Mr. Morse's "solid contractual prospects."

Best Seller Revised

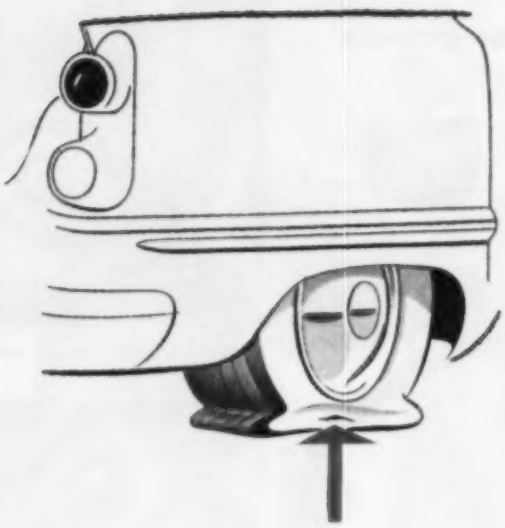
Copies of the 1955-56 edition of the government's best seller, The United States Government Organization Manual, are available for $1 from the Superintendent of Documents, Government Printing office, Washington 25, D. C. This 768-page book names all agencies and divisions of the government in the legislative, judicial and executive branches and describes their functions. It lists names and titles of some 4000 officials.

Pay Hike for 2.1 Million

Washington authorities figure that the new $1 wage rate will mean wage increases to an estimated 2.1 million workers. They are employed in many fields, but particularly in the lumber and textile industries. About 24 million workers will be covered by the law.

Meet Robert W. Clark: He is the new deputy director of the Scientific, Motion Picture and Photographic Products division of the Business & Defense Services Administration.

Mr. Clark is on leave from his duties as an official of Powers Regulator Co. From 1951 to 1953 he served with the Navy, helping to develop an industrial mobilization planning program. Mr. Clark may be contacted in Washington by calling Sterling 3-9200, Ext. 2911.



a hole here is a letdown . . .

a hole here is a lift

Crucible Hollow Tool Steel Bars can step up output on most any production line where ring shaped or hollow parts are made. Why? Simply because the hole is already there. There's no need for drilling, boring, or hole-sawing. And that's where you save production time, increase machine capacity, and avoid scrap losses!

Crucible's famous tool steel grades are available to you in hollow form, in almost any combination of OD, ID and length. In fact, your local Crucible warehouse can give you immediate delivery of these popular grades – KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 air-hardening, and NU DIE V hot-work tool steels.

Ask your local Crucible representative how you can save time and money by using Crucible Hollow Tool Steel Bars. Call him today, at our nearby Branch Office. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

Visit us at Booths 830-832 Production Engineering Show, September 6-16, Navy Pier, Chicago.

CRUCIBLE first name in special purpose steels

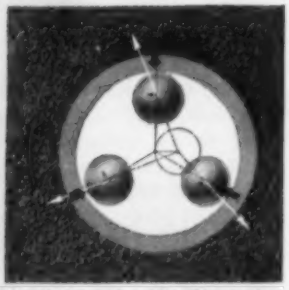
Crucible Steel Company of America

90 minute exasperating job

now accomplished easily in seconds

In the illustration below, the operator shows how easy it is to balance the grinding wheel on a CINCINNATI FILMATIC 10" x 72" Plain Hydraulic Grinder.

Automatic balancing control lever and indicator.



Here's how it works. Three steel balls are carried in a raceway in the wheel end of the spindle. As the spindle rotates while the elastically supported bearing assembly is unclamped, the balls are free to move and correct any unbalanced condition that may exist. Then the complete spindle and bearing assembly is locked in position to form a rigid mounting and retain all the advantages of FILMATIC bearings for precision cylindrical grinding.

Have you ever seen an operator balance a grinding wheel mount on conventional static balancing ways? It's a tedious operation, and may require 90 minutes or more to remove wheel mount, balance and replace mount. Cincinnati did something about this. They developed automatic grinding wheel balancing that does the job ten times more accurately and infinitely quicker and easier.

> *This exclusive Cincinnati feature* automatically balances the grinding wheel mount on the machine . . . within a few seconds . . . while the spindle rotates at its operating speed. *This exclusive Cincinnati feature* eliminates vibration and resultant chatter on the work . . . permits more effective stock removal . . . reduces wheel cost per workpiece.

FILMATIC spindle bearings and automatic grinding wheel balancing constitute a team that just can't be beat for lower cost precision cylindrical grinding. Best of all, these features are *standard equipment* on CINCINNATI FILMATIC 6", 10"-L, 10", 14"-L, 14" and 16" Plain Grinders, and on 6", 10"-L, 10" and 14"-L Angular Feed Plunge Grinding Machines. Extra equipment other sizes. Write today for the complete balancing story. Ask for publication No. G-637-1.

CINCINNATI GRINDERS INCORPORATED

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CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

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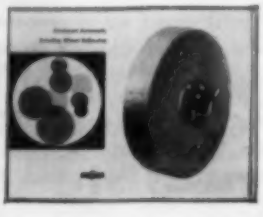
Publication G-637-1 explains the Cincinnati Automatic Balancing principle. Write for a copy.



What a Suggestion Did for F. A. Lackner

ALTHOUGH he doesn't recommend or guarantee it as a good technique, Francis A. Lackner Jr. got his job by suggesting it.

Working part time handling return goods in the credit department of Cherry-Burrell Corp., Chicago, a thought came to him on how to reduce the number of returned items. He dropped a note in the suggestion box: "We should know more about our customers."

The Job—Management's response was immediate: "What are you going to do about it?"

The short note won for Mr. Lackner the post of manager of commercial research.

"Too few firms, particularly the smaller ones," he believes, "are doing market research or getting all they should out of their programs." He feels any company with sales of $1 million or more can use market research to advantage. The department need not be large—Mr. Lackner has no full-time assistants, but he can call upon the field services for help.

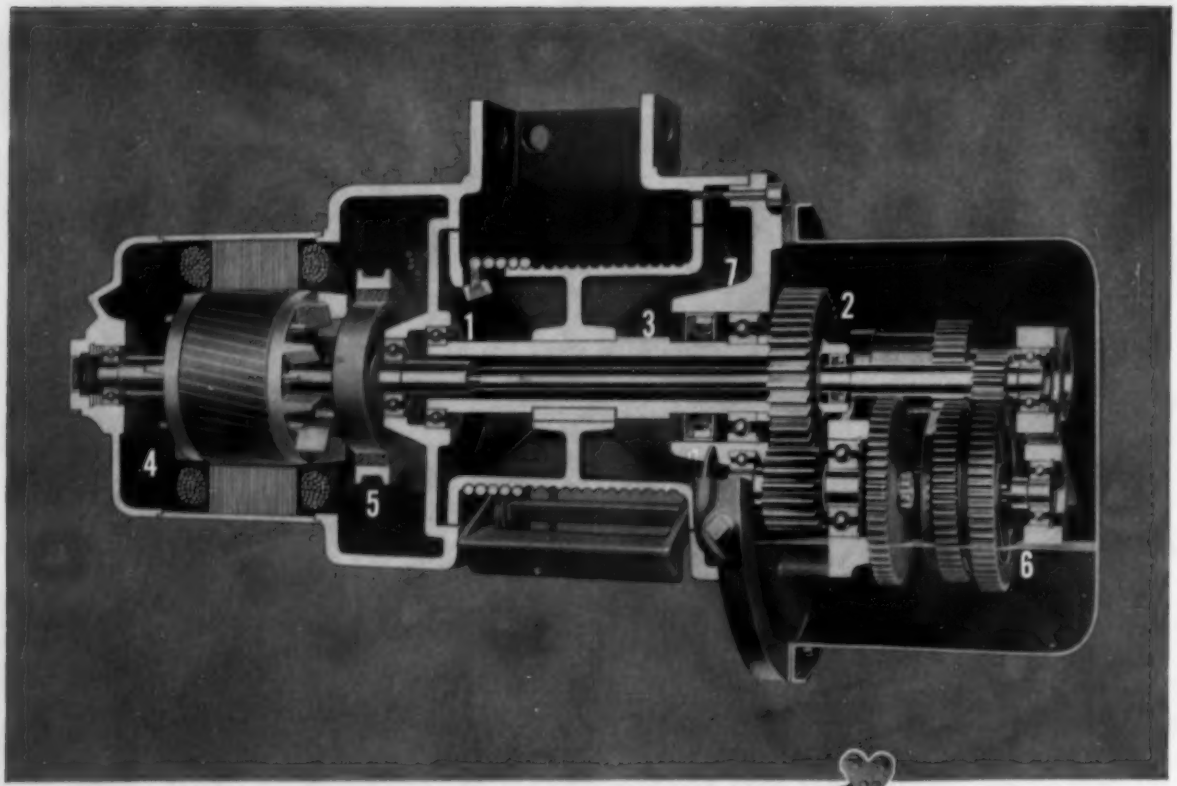
Market research is a tool for management, Cherry-Burrell's research manager emphasizes. Effectiveness of any survey is dependent upon how well the information secured is understood by the person using it. Presentation is important—here's a tip: Keep your primary report short, one page if possible. Answer the question which initiated the survey. Use one or two charts, each having no more than three lines.

Transplanting—Cherry-Burrell's chief customers are in the dairy industry. Sales are handled through 16 branch offices and a number of distributors. One activity which Mr. Lackner rates high in importance to his firm's sales program is that of discovering major weak and strong points of each sales branch. This is done by interviewing field salesmen and their customers. "It's an excellent way," he points out, "to transplant effective techniques from one branch to another. It's particularly effective when you're introducing new products or have products which may be selling well in one area and dragging in another."

The functions of market research generally are considered to be tied to product studies and sales forecasting, says Mr. Lackner. "But here at Cherry-Burrell we've noticed an important by-product—customer relations. Our program has developed to the point where our top management periodically gets out into the field to talk with our customers.

"Customers appreciate the fact that you're trying to supply their needs at the right time at the right price—that you're trying to get to know them better."

TAKE IT UP WITH R&M HOISTS-CRANES-WINCHES



'BIG HOIST' QUALITY WITH 'SMALL HOIST' ECONOMY

A quick look at the Robbins & Myers "J" Hoist shows you the high degree of engineering and manufacturing precision that makes them so durable. The "J" Hoist, at prices competitive with the lowest, can give your handling problems a lift. Features like the following pay off in long service:

1—BEARINGS Nine oversize ball bearings; sealed bearing in hook block.
2—GEARS Wide faced, precision cut, heat treated for tough service.
3—SHAFTS Precision ground high carbon or alloy steel.
4—MOTOR Specially built by R & M for hoist duty; 30 min., 55° C.
5—MOTOR BRAKE Oversize shoes for long life, quick stops, no drift.
6—LOAD BRAKE Weston-type, runs in oil bath.
7—FRAME Single unit, aluminum alloy, ribbed for extra strength.

"J" Hoist capacities range from 500 to 4000 lbs. Prices start at $268.

☐ Send Bulletin 851-B ☐ Have representative call

VENTILATORS MOYNO PUMPS HOISTS CRANES MOTORS FANS

ROBBINS & MYERS INC.

SPRINGFIELD, OHIO BRANTFORD, ONTARIO

In industry uses, synthetics pose no threat to mined gems as . . .

Diamond Market Sparkles

IMPACT of General Electric Co.'s man-made diamond on the industrial market for mined "sparklers" won't be felt for a long time, predict trade spokesmen.

GE isn't saying a word. Going ahead with research, spokesmen say comment would be premature.

Industry Analysis — Athos D. Leveridge, executive manager, Industrial Diamond Association of America Inc., doubts "if the importance of the natural product will be greatly affected for years, if ever." He reports: "The work at GE is still at the research level. It hasn't produced a specimen larger than one-hundredth of a carat."

Mr. Leveridge feels that the cost of industrial diamonds is slight when compared with the work they do (making dies for drawing miles of wire, dressing and shaping grinding wheels, processing tools, etc.). Because of the cost factor, he declares: "If a synthetic diamond is produced at lower cost, the difference in price would be infinitesimal."

Others say that the artificial diamond never will replace the natural stone in making single point tools used for dressing diamond wheels; nor will it be found suitable for making shaped tools in the near future.

On the Other Hand—Some regard artificial stones as a potential source for bort (rough, low-cost diamonds) which can be crushed into powder. It goes into diamond wheels and saws and lapping compounds. It's possible that synthetic diamonds can be made large enough to be used for cluster tools which require small diamonds—set and bonded together.

In the Meantime—Industrial diamond demand is running well ahead of last year's. Reasons: Expanded industrial activity, use of harder materials and the demand for better finishes.

Imports of industrial diamonds hover near 12 million carats annually. Some 70 U. S. companies use about two-thirds of the world's output.

Added Impetus — New machinery, developed for the production of intricate forms, is bringing additional business. Maurice S. Dessau Co.'s Frank Blaine points out that a new field is the manufacture of germanium crystals (for transistors). Germanium must be sliced and diced. Diamond wheels for this work must be thin—0.006-in. and thinner.

Prices are stronger than they were a year ago. C. R. Myer, manager, abrasive division, Elgin National Watch Co., says: "Increased demand has naturally resulted in higher prices on raw material, but these prices are at a reasonable level. A year ago, considerable distress material was on the market. Today, the diamond market is balanced and healthy."

Maurice S. Dessau Co. Inc.

Grinding accounts for much of the demand for industrial diamonds. Being decided here is tool needed to dress wheels that grind aircraft engine parts

Navy To Test Gas Turbine

A packaged 300-kw, 60-cycle generating set with a constant-speed gas turbine engine as a prime mover will be built by Solar Aircraft Co., San Diego, Calif.

A contract with the U. S. Navy Bureau of Ships calls for delivery by December, 1956. The unit must function automatically and be operative in 10 seconds or less.

The Navy wants to find out if gas-turbine-driven generator sets are practical for emergency and regular shipboard service.

SBA Lends to 96 Firms

Loans to small businesses approved by the Small Business Administration in June totaled $4,534,377. Categories covered manufacturing, wholesaling, retailing and service. The money is for the purchase of new equipment and expansion. In some cases, it will finance the processing of defense contracts.

About two-thirds of SBA loans have been made in participation with private banks.

It's the AFL & CIO

A compromise: The name of the combined union formed by the AFL and the CIO will be: "The American Federation of Labor & Congress of Industrial Organizations."

The new name was announced jointly by George Meany, president of both the AFL and the new 15-million member amalgamated union, and Walter Reuther, head of the CIO.

PRODUCTION PROBLEM?

if you use flat-rolled steel talk to a specialist

PROBLEM With present designs and manufacturing facilities, the auto industry needs wide coils of sheet steel with a minimum number of welds. These welds must be cut out before steel goes into the big presses—a costly, time-consuming process.

SOLUTION As a prime supplier to the automotive and other industries, Great Lakes Steel has developed facilities which now produce wide coils of steel in greater lengths . . . drastically reducing the number of expensive welds in each coil. Result: important fabrication savings for our customers.

MORAL Whether you make autos, appliances, or farm machinery . . . if it's flat-rolled steel, you can't lose by talking to Great Lakes Steel—specialists in flat-rolled production and application for 25 years.

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NATIONAL STEEL CORPORATION

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Maker of Mercedes has cheap labor at home, but . . .

D-B's Debut Makes Sense

IN THE WORLD automotive scene, perhaps no name has the magic of Mercedes, the car named after the daughter of an early Daimler-Benz financial backer.

D-B was most recently in the news when two Mercedes 300 SLR cars, which were leading, were withdrawn following the one-in-a-million crash at Le Mans, France. The firm's success in racing includes victories in the 1955 Mille Miglia in Italy, the 1953 Mexican Road Race and many more. Yet behind its string of victories and its sports cars with speeds in excess of 175 mph lie engineering and production victories perhaps even more astounding.

New Start—During World War II, the German auto industry was largely bombed out. Daimler-Benz found 70 per cent damage at its Unterturkheim plant, 85 per cent at Sindelfingen, 80 per cent at Gaggenau and 20 per cent at Mannheim. The Berlin-Marienfelde plant in the American sector of Berlin also was badly damaged, and the remaining equipment was appropriated by the Russians.

As early as 1946, the Mannheim plant was back in operation, and last year D-B was third in German production, with 67,900 cars and trucks. Volkswagen's "People's Car," of course, was first with 242,000 units and GM's Opel was second with 167,650 vehicles. Other German auto manufacturers include Ford, Auto-Union, Borgward, Goliath, Lloyd, BMW and Porsche. Together, their production this year is expected to be up about 10 per cent from the 680,000 units in 1954.

Almost Half Exported — The leading European automaker is still Britain, with France dropped into third place for the second successive year by the German effort. Forty-five per cent of German auto production is exported. Daimler-Benz has established assembly plants in Belgium, Argentina and India. Volkswagen is planning assembly plants in Australia and New Zealand, according to reports, but of particular interest is the planned Daimler-Benz assembly plant in the United States.

Formation of Daimler-Benz of North America Inc., with headquarters in Washington, is announced with the report that a factory will be built in this country at an undisclosed location. Neither the Mercedes-Benz sports cars nor passenger cars will be made here at this time, however. The principal functions of the new assembly and manufacturing plant will be concentrated in the diesel truck, marine and heavy duty industrial fields.

The decision of D-B to build an assembly plant in this country is interesting, since one of the biggest assets of the European automakers is low labor costs. Western Germany employs about 250,000 auto workers, and last year's average hourly rate was only 23.8 cents.

Automation Minded—In view of low labor costs, use of automation in the D-B plants is somewhat surprising. This is particularly notable in view of limited production. At the Unterturkheim plant near Stuttgart there is a new transfer line being installed by Ludwigsburger Maschinbau which performs 18 milling, drilling, boring and facing operations in completely machining rear axle housings.

A few miles away at Sindelfingen, D-B produces sheet metal parts and assemblies with plenty

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D-B makes units such as the jeep-like UNIMOG and this UNIMOG S

of cost cutting techniques. A modern press department includes a couple of new Clearing presses from the United States.

An excellent flow of parts has been worked out for subassembly and final assembly. At Unterturkheim there is an up-to-date production line layout for machining parts and assembling engines, front end units and differentials. At Sindelfingen (photo, page 49) front and rear end assemblies are brought in from the sides to the main conveyor line fitted with locating fixtures. The single unit body and frame assemblies are dropped by an ovehead monorail, with cars coming off the line completely tested and ready for final road testing before shipment.

Plenty of Savvy—The formation of Daimler-Benz North America Inc. is of particular interest because of the many types of vehicle and engineering features which could be introduced, as well as the competitive production know-how manifested by the firm. A good example is the fuel injection system used on the Mercedes 300 SL sports car.

The common complaint with fuel injection in this country, aside from the present cost penalty, is the difficulty in getting a uniformly correct fuel mixture for all engine speeds. So flexible is the 300 SL that the car may be accelerated in fourth gear from 15 mph to 165 mph without flat spots.

Production of these 300 SL sports cars is only five units per day—four of its lighter and smaller counterpart, the 190 SL, are turned out daily. With most of these cars coming to the United States, it is conceivable that assembly in this country might be possible later on.

Diesel—Another interesting car produced by Mercedes is the 180 D, a diesel-engined version of its 180 sedan. Producing only 40 hp, this engine delivers about 33 miles per gallon of inexpensive diesel fuel and cruises at about 70 mph. With judicious use of the gearbox, it will move along with traffic. Using an independent rear suspension, like all Mercedes cars, this little bearcat will stick in the corners like a Band-Aid on a hairy man's arm. Over erratic road surfaces, wheel adhesion is incredibly superior to that of the straight axle.

As American automakers contemplate going to independent rear suspension, Mercedes is contemplating use of an automatic transmission. The coming together of design ideas could make some of these cars possible candidates for U. S. production in the future.

Do-All—Perhaps the best candidate of all, however, is a utility vehicle known as the UNIMOG. Designed as an all-round workhorse for farm and industry, this vehicle is a combination of truck and tractor, with a cargo body, four-wheeled drive, locking differential (to prevent loss of traction if one wheel spins) and power takeoffs front and rear. Power is supplied by the same engine as that of the 180 D. This vehicle does such jobs as plowing, digging potatoes, hauling logs, spraying grapes. It has about 90 basic uses.

Of the 12,000 units produced since D-B took over the vehicle in 1951, most have gone to about 63 foreign countries. A larger vehicle, the UNIMOG S, is built to the same general specifications. As a military vehicle, it will handle ten men and their equipment, cruising at speeds of 60 mph on the highway, or carry 1½-tons.

Problems — Material shortages continue to plague German automakers. Some cold-rolled sheets are imported from the United States. Developing a local market for autos, too, is a long and slow process for the auto is still a luxury. The high costs of fuel and auto taxes do much to continue this picture on the continent, which lacks a second-hand market to create turnover.

In this light, the move of Daimler-Benz to open a plant in the United States makes sense.

Cars named for Mercedes have considerable mechanical attraction which could get around.

Auto, Truck Output

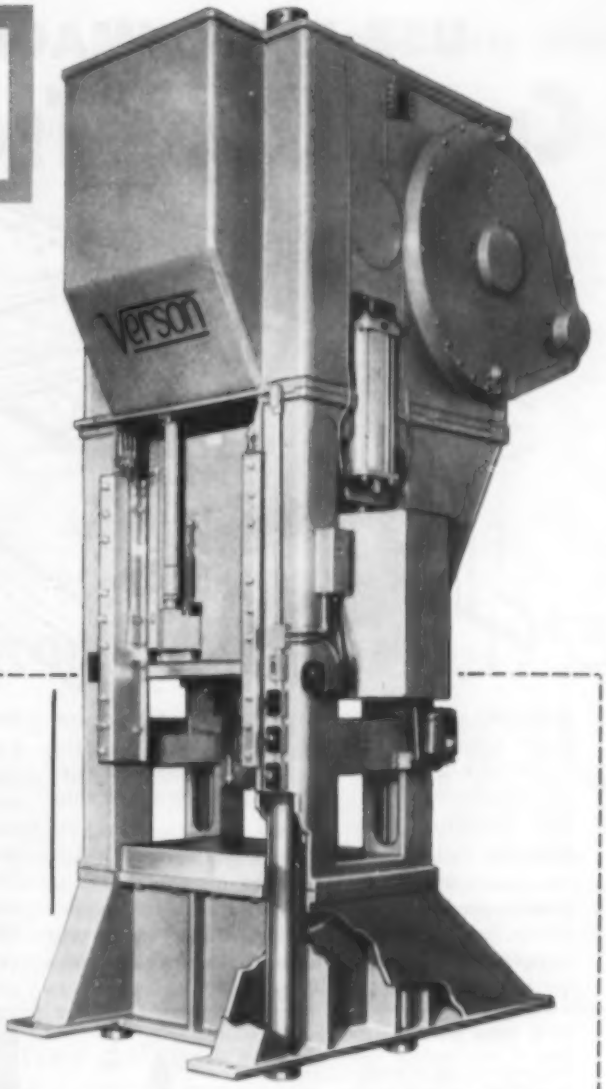
U. S. and Canada

	1955	1954
January	780,780	594,467
February	770,530	574,215
March	955,027	672,858
April	936,994	676,269
May	913,257	621,318
June	825,031†	635,540
July	805,000*	543,540
August		523,799
September		364,441
October		312,078
November		616,395
December		761,954
Total		6,896,874

Week Ended	1955	1954
June 25	191,890	140,695
July 2	195,071	133,141
July 9	167,288	106,169
July 16	207,627	130,757
July 23	210,740†	130,744
July 30	197,000*	130,523

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

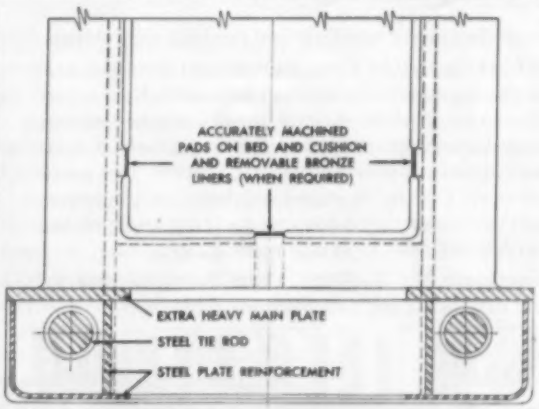
These are the features that make -Verson- presses your best buy



After 30 years

-Verson-

ALL-STEEL FRAMES still set the standards for strength, rigidity and long life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Originated by Verson over 30 years ago, all steel welded frame construction gives you top performance—cleaner stampings—better drawn sections—and substantial savings in tool dollars when you use Verson Presses.

The Verson all steel frame is just one of many reasons for selecting Verson Presses. We'd like to tell you more . . . just call or write. For specific recommendations, send an outline of your requirements.

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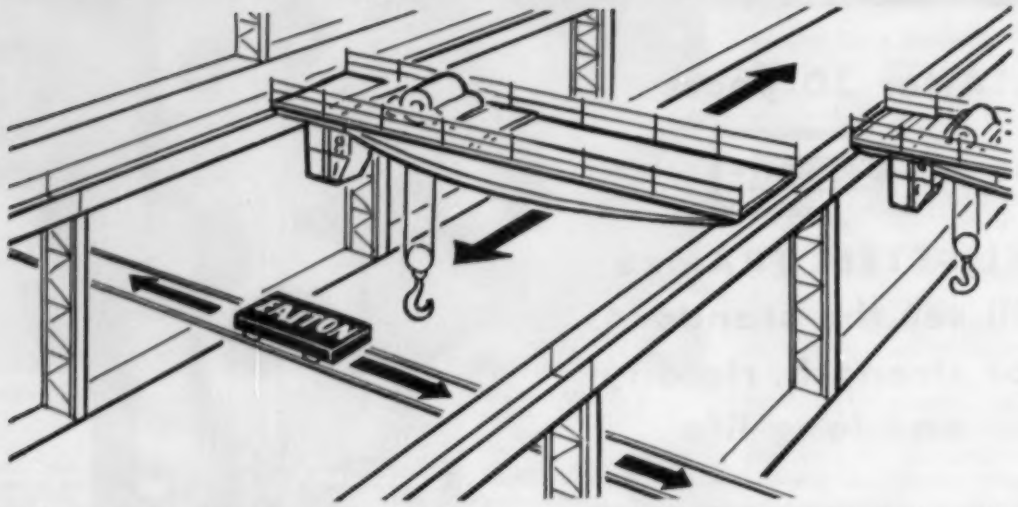
USE YOUR IMAGINATION WITH

Cross-Bay® Transfer Cars



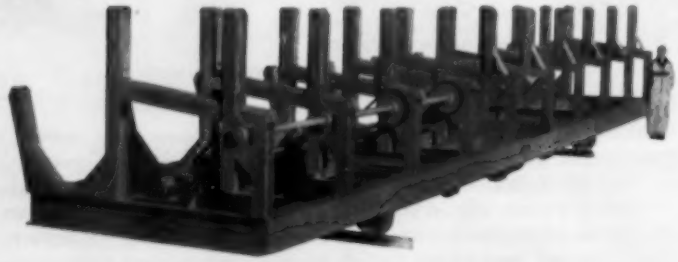
Infinitely variable application of EASTON motor-driven Cross-Bay Cars, together with the possibility of special super-structure design, provides full scope for imaginative planning in this growing era of automatic handling.

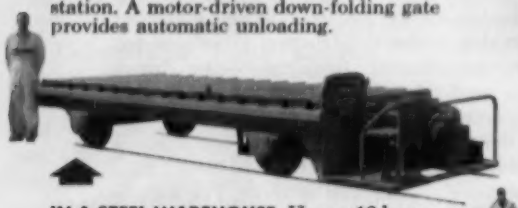
EASTON Cross-Bay Transfer Cars were originally introduced to supplement overhead crane service in modern parallel bay plants and for movement of materials between plant buildings, storage yards and shipping platforms. Operating men everywhere were quick to see the adaptability of the Cross-Bay idea to many other heavy handling and production problems.

EASTON Cross-Bay Cars, controls and special superstructures are custom-designed to meet individual requirements. Customers may specify electric motor, storage battery, gasoline-electric or gasoline-hydraulic power. Controls may be manual, electric (by push-button on the car or remote station) or electronic. EASTON Cross-Bay Cars can be built to capacities from 5 to 500 tons to fit any track gauge.

Investigate the EASTON Cross-Bay idea now for plant expansion and new plant programs.

IN A TUBE MILL. An interesting application of mechanized superstructure. Here several lengths of brass tubing are carried in a special superstructure on an EASTON Cross-Bay Car. The 2 horsepower electro-fluid drive, controlled from a walk-along push-button station on the side of the car, moves the 20-ton loads from station to station. A motor-driven down-folding gate provides automatic unloading.





IN A STEEL WAREHOUSE. Here a 12 horsepower gasoline-hydraulic EASTON Cross-Bay Car handles 25 ton loads of structural shapes in a steel warehouse. A comfortably seated driver operates the car at speeds up to 50 ft. per minute forward or reverse between plant buildings.

IN A STEEL MILL. Here a push-button control panel is attached by a 10 ft. cable to a 100-ton capacity 3 horsepower electro-fluid EASTON Cross-Bay Car. As the operator walks along the car follows carrying two 50 ton slabs of steel.

A-1047

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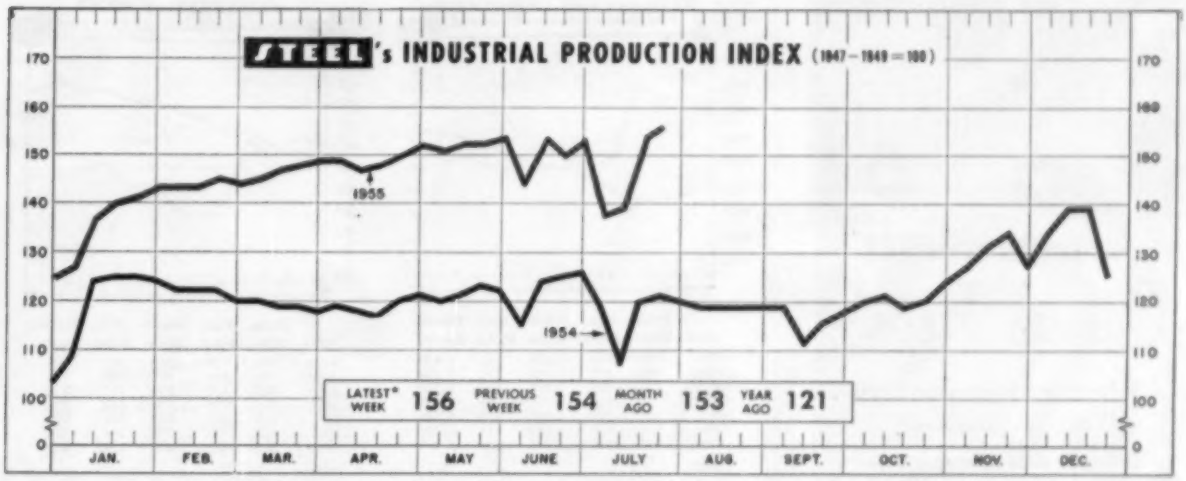


*Week ended July 23. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 22%; Freight Car Loadings 22%; and Auto Assemblies 11%.

Record-Smashing Becomes a Habit in 1955

INDUSTRIAL PRODUCTION in STEEL's index is clipping along at all-time highs. For two weeks in a row new records were set, the latest, 156 per cent of the 1947-1949 average.

Sparking the jumps are soaring electrical output, almost double what it was in the base years; auto output, again, is almost double the 1947-1949 average.

Boosters — Steel production at its current rate of 90-per-cent-plus is another reason why the index is so far above last year's July average of about 120. Freight car loadings are climbing. They're running a little ahead of 1953's, about 18 per cent up from last year's, in recent weeks.

Late reports from metalworking trade associations show: Business in the industrial heating equipment industry seems headed for a record peacetime year, says Carl L. Ipsen, executive vice president, Industrial Heating Equipment Association.

Hot Pace—New orders received by the industry in the first six months are running 64 per cent ahead of those in that period last year. Industrial furnace makers received orders totaling $42.4 million in the first half, compared with $25.8 million in 1954's.

Induction and dielectric heating equipment is enjoying an even bigger surge. In 1954, first-half orders were $3.8 million; in 1955, they soared up 89 per cent, to $7.1 million.

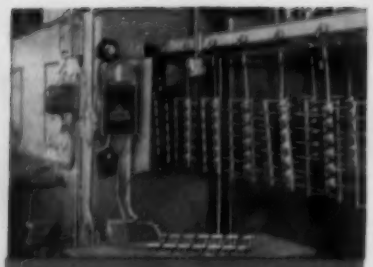
Handling — Materials handling equipment bookings in March hit one of the highest points ever recorded by Material Handling Institute Inc. There was a sharp slide in April, but still the month's business was 10 per cent higher than the 1954 average. Now the trend is up again. May bookings were about 16 per cent above 1954's. The association calls the trend, "significantly optimistic."

Building—Construction, a year ago, was one of the sturdiest props under a sagging economy. This year it's in the forefront of a busi-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,284[1]	2,195	1,532
Electric Power Distributed (million kw-hr)	10,380[1]	10,440	9,103
Bitum. Coal Output (1000 tons)	9,730	7,340	7,206
Petroleum Production (daily avg.—1000 bbl)	6,613[1]	6,626	6,268
Construction Volume (*ENR*—millions)	$360.7	$578.4	$259.3
Automobile, Truck Output (*Ward's*—units)	210,740[1]	207,627	130,744
TRADE			
Freight Car Loadings (1000 cars)	786[1]	799	684
Business Failures (Dun & Bradstreet, no.)	218[1]	224	188
Currency in Circulation (millions)[3]	$30,287	$30,416	$29,854
Dept. Store Sales (changes from year ago)[3]	+10%	+13%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,388	$19,658	$20,730
Federal Gross Debt (billions)	$276.3	$274.3	$270.9
Bond Volume, NYSE (millions)	$19.3	$20.4	$19.6
Stocks Sales, NYSE (thousands of shares)	11,582	11,607	12,881
Loans and Investments (billions)[4]	$84.0	$84.1	$81.1
U. S. Govt. Obligations Held (billions)[4]	$31.7	$31.8	$33.5
PRICES			
STEEL's Finished Steel Price Index[5]	207.76[1]	207.76[1]	195.87
STEEL's Nonferrous Metal Price Index[6]	240.2	239.4	215.8
All Commodities[7]	110.0	110.3	110.2
Commodities Other than Farm & Foods[7]	116.3	116.2	114.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



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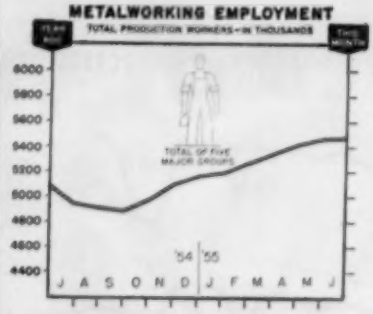
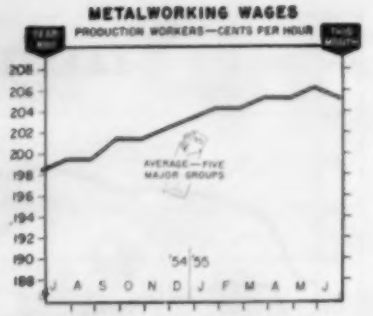
THE BUSINESS TREND



1954	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
June	982	831	1,154	761	1,328
July	969	809	1,111	751	1,279
Aug.	967	820	1,095	766	1,238
Sept.	965	821	1,097	785	1,183
Oct.	969	829	1,093	800	1,249
Nov.	985	844	1,092	811	1,334
Dec.	1,003	843	1,106	809	1,375
1955					
Jan.	1,013	834	1,109	800	1,400
Feb.	1,032	844	1,125	803	1,426
Mar.	1,057	860	1,144	803	1,447
Apr.	1,076	868	1,164	804	1,462
May*	1,097	877	1,173	809	1,462
June*	1,117	877	1,175	809	1,458

*Preliminary.
U. S. Bureau of Labor Statistics.
Charts copyrighted, 1955, STEEL.



1954	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
June	208	189	200	182	212
July	211	189	201	182	212
Aug.	210	190	201	181	213
Sept.	214	191	203	182	216
Oct.	213	192	203	184	216
Nov.	214	193	203	184	215
Dec.	214	194	204	184	219
1955					
Jan.	216	195	203	185	220
Feb.	215	195	204	185	220
Mar.	216	195	205	185	221
Apr.	217	195	209	186	220
May*	218	196	207	187	222
June*	219	196	208	186	219

*Preliminary.
U. S. Bureau of Labor Statistics.

ness upswing that is well on the way to making 1955 the most prosperous year on record.

Amid predictions of a building slump for this year, the industry has set record after record. The pace set in the first half is almost guaranteed through the second.

Record Year for Building . . .

Here's why: Building contract awards in the first six months are over $12 billion, 30 per cent above last year's record for the period (in 37 eastern states). Since contract letting precedes building: "The year will almost certainly establish a new record for construction put in place." So predicts Dr. George Cline Smith, economist for F. W. Dodge Corp., long established specialist in construction news and marketing.

"One of the most striking features of the situation is the broad base of the increased activity," observes Dr. Smith. "In addition, there has been no indication of a downturn in recent months."

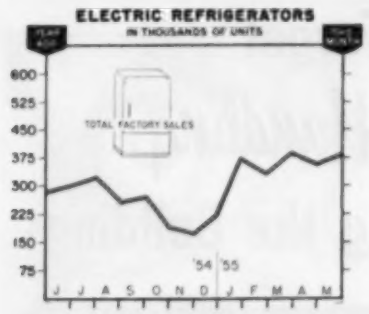
Fast Pace Continues . . .

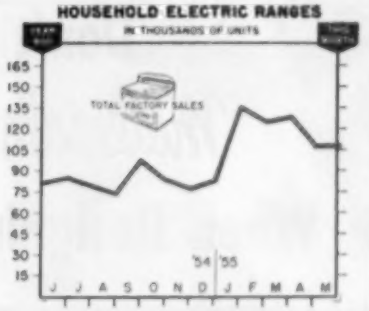
Such large percentage increases over last year can't be expected to go on forever. But there hasn't been any slowdown so far. Dr. Smith sees these plus signs in the construction picture: 1. A broad-based reversal of the post-Korea slide in industrial building. 2. Residential construction making big increases over a year ago, with much of the upward push coming from single family homes. 3. Every major category of construction showing increases over last year, most of them substantial. 4. The smallest increase was in educational buildings, up only 4 per cent; still, that category marked up a new first-half record of over $1 billion.

The life in industrial construction surprised many experts who predicted a continued decline for this year. Awards have risen sharply since early in the year and now stand about 45 per cent ahead of 1954's first half. The $850-million total is the highest for any first half since World War II, except 1951 when huge atomic energy contracts swelled the total.

Metalworking Expands . . .

The upturn is spread over 18 of the 23 major manufacturing categories. The chemical industry is a big spender, but swelling the total are primary ferrous metals, fabri-





Total Factory Sales—Units

	1955	1954	1953
Jan.	391,197	344,401	325,186
Feb.	338,575	334,122	377,606
Mar.	392,774	330,641	368,498
Apr.	364,298	280,900	366,951
May	390,385	282,184	317,667
June		303,127	343,114
July		325,061	298,838
Aug.		256,663	232,981
Sept.		271,859	231,224
Oct.		190,753	179,749
Nov.		175,557	139,563
Dec.		228,612	197,102
Total		3,323,562	3,378,478

National Electrical Mfrs. Assn.

Total Factory Sales—Units

	1955	1954	1953
Jan.	136,663	101,870	88,145
Feb.	127,155	109,647	114,465
Mar.	130,180	115,393	130,788
Apr.	108,619	92,781	118,990
May	100,263	83,649	114,404
June		85,884	113,086
July		80,017	77,836
Aug.		75,907	74,326
Sept.		99,611	84,481
Oct.		84,321	73,422
Nov.		79,340	55,745
Dec.		85,033	73,870
Total		1,092,393	1,119,570

National Electrical Mfrs. Assn.

cated metal products, machinery and ordnance. But, as metalworking stands out among the increases, so it also does in categories that are spending less than last year: Primary nonferrous metals, aircraft, electrical machinery and equipment and miscellaneous transportation equipment.

Commercial building awards have gained spectacularly since last year, bulging over the $1-billion mark in the first half for the first time in history. Awards for public works at $1.7 billion set a new first-half record, 25 per cent ahead of those a year earlier. Highways are up 42 per cent; utilities, 38 per cent—far out in front of 1952's record first half.

Recovery Is Genuine . . .

Business is good in two important metalworking centers, Pittsburgh and Cleveland. In the city of the Golden Triangle, activity is back near the year's peak after being badly dented by the short-lived steel strike, reports the Bureau of Business Research, University of Pittsburgh. That means it's near the best in two years.

In Cleveland, the Federal Reserve Bank says: "The continued expansion in business activity throughout the first half of the year leaves no doubt that recovery from last year's recession is genuine. Construction, new car sales and electric power output set records. Unemployment declined steadily during the period."

Trends Fore and Aft . . .

Railroad equipment buying keeps improving. Class I roads had 470 locomotive units on order as of July 1, compared with 385 a month earlier and only 124 a year ago, reports Association of American Railroads . . . Distributor-to-dealer movement of Admiral room air conditioners set an all-time record in the two weeks ending July 15; distributor sales were 51 per cent higher than any other two-week period . . . In bigger air conditioning units: Chrysler Airtemp records a 101 per cent increase in its air-cooled (waterless) models; the high construction rate and stepped-up sales efforts account for the gains . . . Factory sales of household vacuum cleaners in June were the highest for that month since 1950, and the half-year total was greatest since the second half of that year, reports the Vacuum Cleaner Manufacturers' Association. June sales were 241,665.

• Edited by GEORGE BLACK

ENGINEERING DATA BOOK

Another section of the new Cooper Alloy catalog being readied by the Valve and Fitting Division is now available. Referred to as "Stainless Steel Engineering Data," this 16 page manual includes a variety of tables and charts of reference value for those who work with stainless steel valves, fittings, pipe, tubing or castings. Your copy is waiting.

ADVANCED KNOW-HOW #1

The full story behind the Shellcast® stainless steel jet engine support rings being turned out by the Foundry Products Division of Cooper Alloy is told in Advanced Know-How Report #1. The problem, the specifications and the solution are covered in detail with text and photos. Write for your copy.

PUMPING ETCH ROOM SOLUTIONS

Transferring acids and salt solutions used in the Etch Room of Litho Chemical & Supply Co. caused repeated pump failure and constant shaft seal maintenance. Five years ago a Vanton plastic pump (no stuffing box, no shaft seals) was put into daily service. Customer reports "no maintenance except lubrication." Full story appeared in Chemical Processing (July). Reprint available on request.

QUIKUPL DATA POPULAR

Since the publication of the May issue of Newscast which featured this patented fitting, the requests for additional data have been pouring in. In case you missed the issue, may we remind you that copies are still available. Full engineering data, case histories and photographs are included, making it possible for you to see for yourself just how this unique stainless steel fitting can cut your installation and operating costs.

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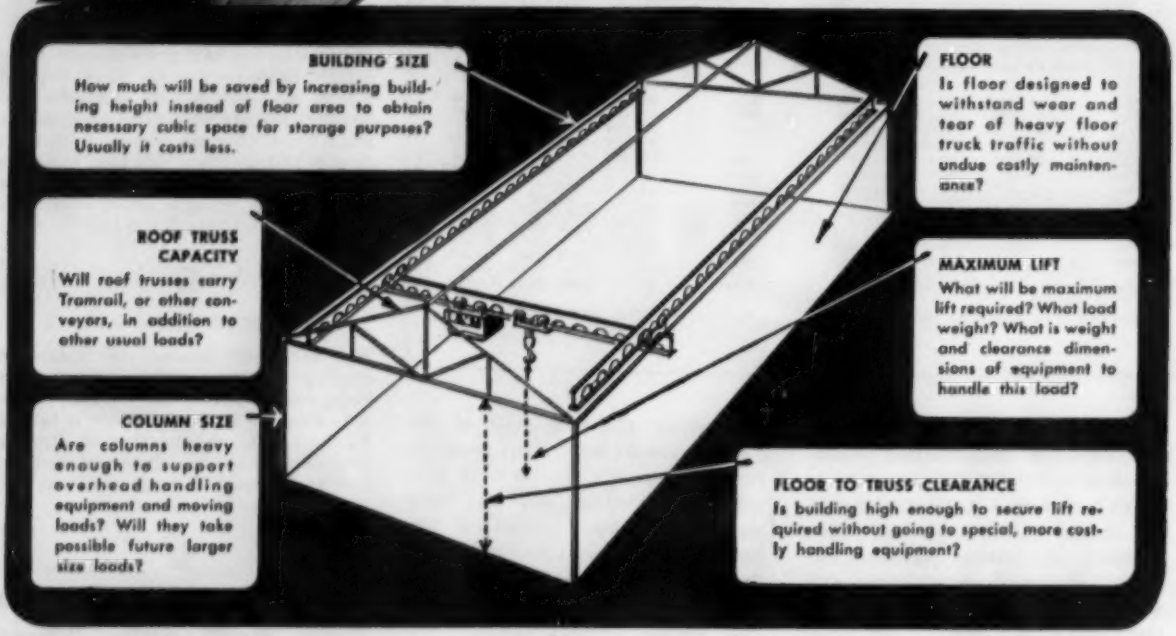
Don't Forget *Materials Handling* When Designing the Building


BUILDING SIZE
How much will be saved by increasing building height instead of floor area to obtain necessary cubic space for storage purposes? Usually it costs less.
ROOF TRUSS CAPACITY
Will roof trusses carry Tramrail, or other conveyors, in addition to other usual loads?
COLUMN SIZE
Are columns heavy enough to support overhead handling equipment and moving loads? Will they take possible future larger size loads?
FLOOR
Is floor designed to withstand wear and tear of heavy floor truck traffic without undue costly maintenance?
MAXIMUM LIFT
What will be maximum lift required? What load weight? What is weight and clearance dimensions of equipment to handle this load?
FLOOR TO TRUSS CLEARANCE
Is building high enough to secure lift required without going to special, more costly handling equipment?

The foremost demand of a new factory building, whether for production or storage, is that its design and construction aid overall operating efficiency to the utmost. Thus, the building becomes more than just an enclosure, but is actually a vital part of the manufacturing process.

It is, therefore, imperative that the various steps entering into the making of an item be thoroughly considered when the building is designed. One of the most important of these concerns materials handing because this item often amounts from 25% to 50% of the total production cost, and, also, because it is plant-wise in nature.

Regardless of what handling methods are deemed best, overhead cranes or Tramrail, roller or chain conveyors, floor trucks, etc., the building design, size and construction usually has a tremendous bearing on the ultimate handling efficiency secured. Building clearances, floor construction, column locations, aisleway allowances and other factors must be considered for the different handling methods for most satisfactory results.

For initial economy in installation, for most satisfactory operation and highest efficiency, plan for materials handling when you design the building. ***Do not make materials handling an afterthought.***

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THE CLEVELAND CRANE & ENGINEERING CO.
7873 EAST 284TH ST. *WICKLIFFE, OHIO*

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

DANIEL J. YOUNGERMAN
. . . Clark Equipment div. purchasing agent

Clark Equipment Co. appointed **Daniel J. Youngerman** purchasing agent for its construction machinery division, Benton Harbor, Mich. He was assistant purchasing agent of Studebaker-Packard Corp., where for 12 years he was in charge of truck division purchasing.

James E. Thompson was made sales assistant, Horton Chuck Division, **E. Horton & Son Co.**, Windsor Locks, Conn. He was sales supervisor with Union Mfg. Co. **Robert E. Giauque** was made works manager and chief engineer, responsible for two manufacturing divisions, Horton Chuck and Gabb Special Products Division.

Howard E. Chilcoat will retire Sept. 1 as vice president-general sales manager, **Townsend Co.**, New Brighton, Pa., and will transfer to Santa Ana, Calif., to fill the new post of West Coast sales manager. He will retain his vice presidency. **George A. Bentley** will become general sales manager. **Robert E. Casner** becomes central division manager in Detroit, and is replaced as general superintendent at the New Brighton plant by **John W. Hernlund**, whose title will be works manager.

Johnston Mfg. Co., Minneapolis, elected **R. J. Shannon** president and **W. E. Johnston** chairman of the board.

GEORGE CAMERON
. . . Colonial Broach engineering dir.

George Cameron was made director of engineering and **Gordon Cook** supervisor of broach engineering at **Colonial Broach & Machine Co.**, Detroit. Mr. Cameron was co-owner of Cameron & White Co., engineering firm.

Kenneth Bryan, formerly with Babcock & Wilcox Co., was named superintendent, electric furnace melt shop, **Northeastern Steel Corp.**, Bridgeport, Conn. **Charles P. Hammond** will be general superintendent, rolling mills, Bridgeport works.

Charles H. Schiller was made administrative assistant of sales, **American Steel & Wire Division**, Cleveland, U. S. Steel Corp. He is succeeded as manager of commercial research by **Elliott D. Jones. William P. Keefe** was made assistant manager-commercial research.

Charles Kuhn was made sales manager, products division, **Hills-McCanna Co.**, Chicago. He was vice president-sales of Fansteel Metallurgical Corp.

Francis G. Kredel, superintendent of the 10 and 12-in. bar mills at the Cleveland steel plant of Republic Steel Corp., was named chairman of the bar mill committee. He is succeeded by **E. W. Carlson**, former assistant bar mill superintendent at Chicago. Mr. Kredel succeeds **B. F. Handloser**, retired.

CURTIS B. HOFFMAN
. . . Brush Electronics v. p.-sales

Curtis B. Hoffman was elected vice president-sales, **Brush Electronics Co.**, Cleveland, a division of Clevite Corp. In addition to administrative duties, he will direct the marketing of industrial and research instruments, electronic components and electronic memory devices.

T. J. Winter was made assistant sales manager, **Wright Hoist and Ford Chain Block Divisions**, American Chain & Cable Co. Inc., York, Pa. He joined the Wright Hoist Division in 1947 and most recently was district sales manager in the Detroit-Cleveland area.

Carl E. Rowe was elected vice president-manufacturing and **William J. Brinkman** vice president-engineering, **Presco Casting & Mfg. Corp.**, Chesterton, Ind.

Robert Duffy was made Milwaukee district sales manager, **Lindberg Engineering Co.** He succeeds **Robert Onan**, now president of Waukee Engineering Co., Milwaukee.

Sterling C. Nichols was appointed general sales manager, **Steel Fabricators Co.**, Cleveland. He has been sales representative since 1949.

Tom Davidson was made sales manager of **O & M Machine Co. Inc.**, Los Angeles.

Ken R. Gerlach, formerly with Sperry Gyroscope Co., joined **Bogue**

SIDNEY G. YOUNG
. . . Lewis Rolls sales manager

WILLIAM J. BLASHILL
. . . Udylite Div. manufacturing mgr.

LORING S. BROCK
. . . U. S. Steel product dev. director

Electric Mfg. Co., Paterson, N. J., as executive vice president.

Sidney G. Young was appointed sales manager for **Blaw-Knox Co.'s** Lewis Rolls Department, Pittsburgh. He succeeds **Glen McDowell.** Mr. Young joined Blaw-Knox in 1948 after ten years with U. S. Steel Corp. at Gary, Ind., and the Irvin Works.

Delta Power Tool Division, Rockwell Mfg. Co., Pittsburgh, appointed **Byron E. Coon** sales promotion and merchandising manager and **John P. MacCrossen** regional manager, western region. Mr. MacCrossen, who succeeds Mr. Coon, was San Francisco district sales manager. He continues headquarters in Oakland, Calif. Mr. Coon moves to Pittsburgh.

Aluminum Co. of America, Pittsburgh, named **Lewis P. Favorite** manager of product sales; **Frederick J. Close,** manager of market development; and **W. S. McChesney,** manager of industry sales.

George Kelley was made manager of heating and air conditioning, **Day & Night Division,** Carrier Corp., at Monrovia, Calif.

John H. Island and **Kenneth E. Whitekettle** were made sales managers for Baltimore Brush Division, **Pittsburgh Plate Glass Co.,** Pittsburgh. Mr. Island will supervise the paint and varnish brush department. Mr. Whitekettle heads power driven brushes.

William J. Blashill was named manager of manufacturing and **Louis J. Minbiole Jr.** sales manager, **Udylite Division,** Udylite Corp., Detroit. **L. Eugene Drury** was made facilities manager.

V. C. Warfield was made western division merchandise manager for **American Blower Corp.,** with headquarters in Chicago. He will service jobbers in the Chicago, Minneapolis, Milwaukee, Rock Island, (Ill.) South Bend, Ft. Wayne and Indianapolis (Ind.) areas.

Brainard Steel Division, Sharon Steel Corp., appointed **John M. Magde** manager of its Larchmont avenue plant at Warren, O. He was plant manager of the Griswold street plant.

Clayton A. Kolstad, former production planning manager, was appointed controller of **Sargent & Co.,** New Haven, Conn. He is succeeded by **William Larkin** who was purchasing agent. Mr. Larkin is responsible for all production planning and purchasing. **Walter C. McCaughey** was made purchasing agent, **George Ulrich** a buyer in the purchasing department.

Jerome A. Winston was made rolling mill superintendent at Bessemer, Ala., for **Tennessee Coal & Iron Division,** U. S. Steel Corp.

George H. Buchner was made director of contracts and spare parts for **Northrop Aircraft Inc.,** Hawthorne, Calif.

Loring S. Brock was made director, product development division, commercial department of **United States Steel Corp.,** New York, responsible for commercial phases of product planning and development of new products. These activities were temporarily under the direction of **Robert C. Myers,** director of market development.

Appointed divisional superintendents at **Granite City Steel Co.,** Granite City, Ill., are: **Harold A. Muttach,** coke ovens, blast furnaces and open hearths; **Clarence R. Mitchell,** rolling mills; and **Russell G. Solomon,** finishing.

J. A. Rishel Jr. was made general sales manager, **Amana Refrigeration Inc.,** Amana, Iowa. He succeeds **E. L. Hinchliff** who relinquished the post to become special merchandising consultant for the company. Mr. Rishel joined Amana in May as a special representative. He was formerly general sales manager of Deepfreeze Appliance Division, Motor Products Corp.

P. C. Will, who resigned as vice president-engineering of Hydro-Blast Corp., is associated with **Edwin Hancock Engineering Co.,** Chicago.

James H. Joyner was made Pacific Coast sales manager, **Quaker Pioneer Rubber Mills,** division of H. K. Porter Company Inc., San Francisco.

Frank V. Stauffer was made De-

Users of tubing for cylinder applications—now you can have this new...

J&L Cold Drawn ELECTRICWELD

Tubing with a Special Smooth ID Finish

Reduces your overall production costs in applications like these . . .

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- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like inside surface finish is today busy helping manufacturers reduce or entirely eliminate costly machining on many applications and is being substituted for more costly types of steel tubing. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

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J&L Cold Drawn ELECTRICWELD Tubing can be furnished in its three specifications in OD sizes from ⅝-inch to 2½ inches and in wall thickness from 20 to 10 gage, 0.035 and 0.134-inch respectively.

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J. ROBERT JONES

JOHN R. JOERGER

. . . Kearney & Trecker executive sales positions

troit district manager for **Bellows Co.**

At **Kearney & Trecker Corp.**, Milwaukee, **J. Robert Jones** was made general sales manager and **John R. Joerger** sales manager of a new aircraft machine division. Mr. Jones continues as sales manager, standard machine division.

Arthur H. Luchs was elected vice president in charge of western sales for **Dickey Industries**, Cleveland. He has headquarters in San Francisco.

J. O. Slaybaugh was made Cleveland division manager, **Diversey Corp.**

Hugh J. McKane, Atlanta, was made southern district manager, **Bay State Abrasive Products Co.**

H. Gordon Smith, executive vice president, **United States Rubber Co.**, New York, has also been elected vice chairman of the board and chairman of the executive committee. **Chester J. Noonan**, vice president, was elected a member of the executive committee.

Robert W. Dibble succeeds **Allan J. Peterson**, retired, as manager of general sales, **International Harvester Co.**, Chicago. He is succeeded as assistant manager-general sales by **B. H. Bagby.**

Carl E. Haugh, formerly with Hydropress Inc., joined **Continental Foundry & Machine Co.**, Pittsburgh, in sales for rolling mills and heavy machinery.

John F. Dockum and **Brooks M. Dyer** head new sales groups for **Columbia-Southern Chemical Corp.**, Pittsburgh. Mr. Dockum is manager of chrome chemical sales. Mr. Dyer will supervise the calcium chloride sales group.

Leland Electric Co., Dayton, O., division of American Machine & Foundry Co., elected **Rex D. Marsh** vice president-sales and **Walter T. Buhl** vice president in charge of engineering and manufacturing. Mr. Marsh joined Leland in 1953 as sales manager and was formerly president and a director of the Canadian subsidiary, Bowser Inc. Mr. Buhl, a consulting engineer for the last four years, was formerly research director at Whirlpool Corp.

REX D. MARSH

WALTER T. BUHL

. . . Leland Electric Co. vice presidents

Paul E. Forsythe was appointed vice president-general manager, **Hallidie Machinery Co.**, Seattle. For the last ten years he was manager of the commercial and engineering department, Western Gear Works.

Kenneth V. Dawson was named sales engineer for **Kaiser Steel Corp.'s** Napa, Calif., fabricating plant. For the last two years he was commanding officer of the San Francisco branch office, Office of Naval Research.

Herbert Tramer was made a vice president at Chicago for **Federal Enameling & Stamping Co.** He was director of sales at Belmont Stamping & Enameling Co.

Purchasing appointments for **Mercury Division**, Ford Motor Co., Detroit, include: **S. A. Cornell**, assistant general purchasing agent; **S. T. Myres**, purchasing agent, machined and service parts department, **E. W. Reynolds** assistant purchasing agent and **James Veras** senior buyer in the department; **C. M. Bowen**, assistant manager, purchase analysis department and **D. B. Bachman** supervisor in purchase analysis.

Wallace T. Gray was made gen-

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ANNIVERSARY

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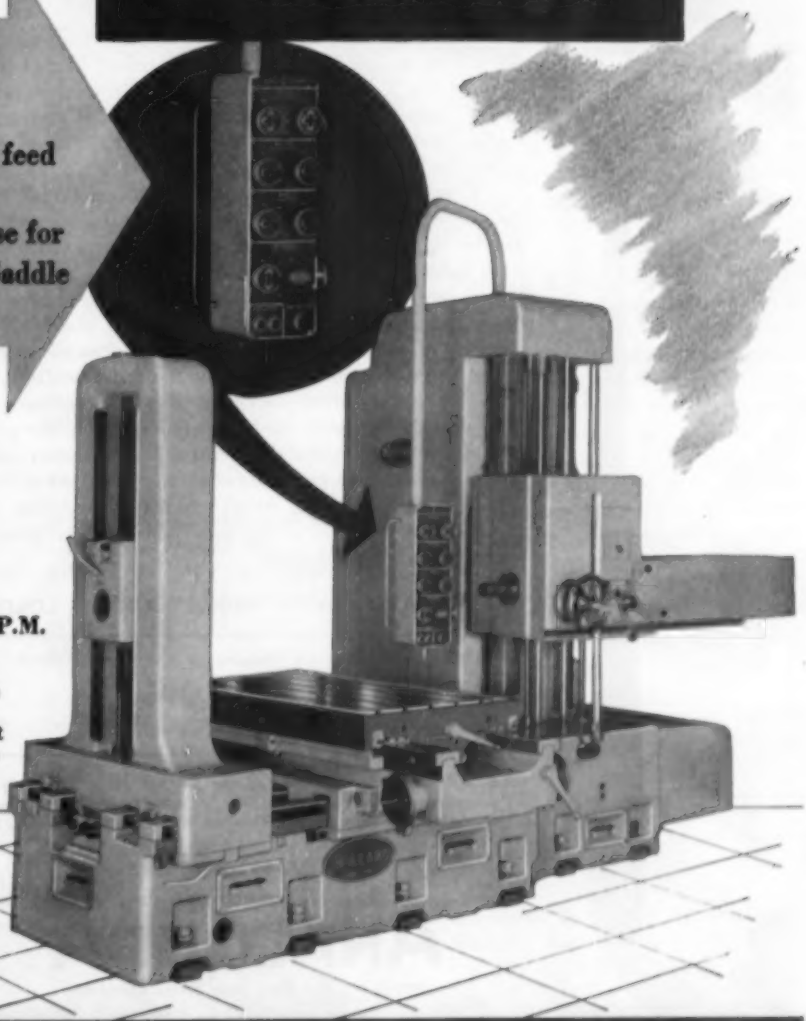
PENDANT CONTROL
Complete **machine control from a movable station for feed and speed selections, directional feed and traverse for Spindle, Head, Table and Saddle**



ADDITIONAL FEATURES

- **Both Screw and Rack Feed to the spindle**
- **Massive 4-Way Bed, Head, Headpost and Rear Post for rigidity**
- **Spindle Speed up to 2000 R.P.M.**
- **Replaceable Ways, chrome hardened, on Bed and Saddle**
- **Optical measuring equipment for head and table (optional)**

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FISHING FOR WAYS TO CUT ELECTROPLATING COSTS?

KNICKERBOCKER FOUND IN TEST THAT IT CAN

- **Cut cost of solution correction**
- **Cut Power Costs by 1/3 or Boost Production**

WITH

"PLUS-4" ANODES

(PHOSPHORIZED COPPER)

The Knickerbocker Electrotype Co. of New York filled its Tank No. 1 with AnacondA "Plus-4" Phosphorized Copper Anodes, set up Tank No. 2 as a control, using only electric tough pitch copper anodes. Solution concentrations are tested and corrections made weekly—and consistently Tank No. 1 with the "Plus-4" Anodes has shown the better record.

After five months of testing, Mr. William Welsh, foreman of the plating department, expressed his satisfaction with "Plus-4" Anodes and made this statement: "Using regular anodes, we must hold our cathodes at least 4½ inches from the anodes. This is necessary because the sludge from the old anodes will fall on our work and cause roughness. With the new 'Plus-4' Anode, there being no loose sludge, we could work much closer—only 3 inches away—which would reduce the resistance by ⅓—which would in turn reduce our power costs by about the same proportion. This would also reduce the heat generated by a like proportion."

Mr. Welsh explained that because Knickerbocker uses thermoplastic molds, heat is important—the tanks must run no higher than 95F to prevent warping. As an alternate to reducing power, he explained that he could use the same power and run plates through faster, increasing production.

WHY PLATING WITH "PLUS-4" ANODES COSTS LESS!

+ **1** no anode sludge (no "bagging" or diaphragms required)
+ **2** no copper "build-up" in solution
+ **3** smooth, heavy cathode deposits
+ **4** up to 15% more cathode deposit per anode

SEE FOR YOURSELF — For details on how you can get a test supply of "Plus-4" Anodes sufficient to fill one tank, write to *The American Brass Company, Waterbury 20, Conn.* In Canada: *Anaconda American Brass Ltd., New Toronto, Ont.*

"PLUS-4" ANODES

A PRODUCT OF

ANACONDA®

made by The American Brass Company

For use under Patent No. 2,689,216

Here is a "Plus-4" "fish" pulled out of a Knickerbocker tank. It measures .170" at the thickest part at the bottom and .058" at the thinnest point. This remnant of a 40-lb. anode weighs only 2 lb., 3 oz. "Plus-4" Anodes corrode this way regularly—another indication of the superior job they can do for you.

JACK F. ANSCHUETZ
. . . Hamilton press sales mgr. at B-L-H

EDGAR D. FLINTERMANN
. . . Detroit Gray Iron Foundry v. p.

GEORGE H. GARRAWAY
. . . mfg. dir. at New York Air Brake

eral works manager, **Leece-Neville Co.**, Cleveland.

Jack F. Anschuetz was made sales manager for **Baldwin-Lima-Hamilton Corp.'s** Hamilton presses. He has headquarters at Hamilton, O. He was sales manager for Clearing Machine Corp.'s Hamilton division.

Samuel C. Wagner joined **Kaiser Aluminum & Chemical Sales Inc.**, as assistant to the general sales manager in its Chicago sales headquarters office. He formerly was assistant manager of sales in the sheet and strip division, Inland Steel Co.

Robert P. Gibson was made assistant to the superintendent of the masonry department at the Buffalo plant of **Republic Steel Corp.**

W. M. Koenig was appointed manager of stainless steel sales, **Rotary Electric Steel Co.**, Detroit; **David Cooke** succeeds him as head of Rotary's eastern sales office, Newark, N. J.

Edgar D. Flintermann was elected executive vice president, **Detroit Gray Iron Foundry Co.**, Detroit. He recently resigned as president of Misco Corp.

Joseph E. Seibold was named manager of the merchandising division, **Worthington Corp.**, Harrison, N. J. He succeeds **J. O. Glenn** who resigned.

R. C. Roderick was appointed assistant to the manager of manufacturing, **Fruehauf Trailer Co.**, Detroit. For last six years, he was with A. O. Smith Corp., as manager, railroad products division.

Willis R. Slaughter was elected a vice president of **W. L. Maxson Corp.**, New York. A brigadier general, USA, ret., he joined Maxson in July, 1954 as plans and programs adviser.

Forrest Stretmater was promoted to chief metallurgist from assistant chief metallurgist at **Servel Inc.**, Evansville, Ind.

George H. Garraway was appointed director of manufacturing, **New York Air Brake Co.**, New York. Before joining the company in June, 1954, he was vice president of Orr & Sembower and prior to that was chief engineer, Quimby Pump Division, H. K. Porter Company Inc.

Goddard & Goddard Co., Detroit, made **H. C. Henderson** executive vice president and treasurer; **L. H. Goddard**, vice president-marketing; **S. H. Grattan**, vice president-engineering; and **W. H. Fritz**, vice president-manufacturing.

J. A. Zurn Mfg. Co., Erie, Pa., announces four promotions: **Thomas A. Kennedy**, assistant to the president; **John Henry Zurn**, vice president-general manager; **Albert A. Baker**, vice president-sales; and **John L. Derby**, director of manufacturing.

Wilbur Deutsch was appointed sales manager, **Lectroetch Co.**, East Cleveland, O.

OBITUARIES . . .

George J. Belknap, 64, former vice president and general manager, **Belknap Mfg. Co.**, Bridgeport, Conn., died July 16.

Sheldon S. Spire, retired chief experimental engineer, **Syracuse Chilled Plow Works**, Syracuse, N. Y., died July 12.

William F. Zimmerman, 71, executive vice president, **Gould & Eberhardt Inc.**, Irvington, N. J., died July 9.

Alton W. Healy, 65, senior member of the sales staff, **Continental Screw Co.**, New Bedford, Mass., died July 12.

Michael J. Wynn, 56, manager of Jersey City, N. J., plant, **American Can Co.**, died July 13.

Raymond D. Brown, 55, president, **Eastern Steel Tank Corp.**, Flushing, N. Y., died July 20.

Frank C. Mahnke, 85, purchasing agent and office manager, **Gilbert & Bennett Mfg. Co.**, Blue Island, Ill., died July 13.

Pressmaker Expands

Clearing Machine Corp. to spend $3 million for construction and equipment

CLEARING Machine Corp., a division of U. S. Industries Inc., Chicago, has launched a $3-million expansion program. It calls for new facilities scheduled to be in operation within three months.

A building is being built next to the firm's Chicago plant. Over 61,000 sq ft, it is designed for expansion. Considerable new equipment will go into it, including five overhead cranes up to 75 tons of capacity to handle huge weldments fabricated there.

Plans also call for the purchase of milling machines and other major machine tool equipment.

Demand Soars — Clearing Machine is a major manufacturer of industrial presses. John I. Snyder Jr., chairman of the board and president of U. S. Industries Inc., stresses the need for speedy expansion, pointing out that demand for Clearing's products is at a record high. Plans of many of its customers call for greater use of modern cost-reducing machines and increased production.

Clearing presses range from 45-ton units used to draw small stampings to giants capable of drawing automobile tops or bending keels for ships.

Improves Tool Bit Department

Vanadium-Alloys Steel Co., Latrobe, Pa., has begun production in a new integrated department designed to meet the growing demand for fine-finish tool bits. Each stage of tool bit manufacture from the hot-rolled bars to the ready-for-shipment bits is located in the new building adjacent to the firm's main plant.

Westinghouse Unveils Plant

Westinghouse Electric Corp., Pittsburgh, has unveiled its factory at Cheswick, Pa., designed to produce parts for atomic power plants. Skilled machinists are manufacturing "canned" motor-pumps that send radioactive fluids through the hermetically-sealed systems of nuclear power plants. "Canned" motor-pumps currently in production range in size from ½-hp or 5 gal per minute up to 300 hp or 4000 gal per minute. Weight ranges from 60 lb to nearly 3½ tons. Some parts are worked to tolerances of 3 to 5 millionths of an inch.

Koppers To Build Coke Ovens

Inland Steel Co., Chicago, awarded a contract for construction of a battery of 87 coke ovens to Koppers Co. Inc., Pittsburgh. The project is part of a multi-million dollar construction program (STEEL, May 23, p. 166) for the company's Indiana Harbor, Ind., Works. It will increase the plant's coke-making capacity 21 per cent to 2,598,000 tons.

Koppers will design and build additional coal chemical facilities as well as equipment for handling coal and coke.

The new coke battery will be the seventh at the plant. Its output will supplant coke purchased.

It also will increase the company's production of coal chemicals, such as tar, toluol, benzol, naphtha, pyridine and ammonium sulphate.

Engineering work has been started. The construction schedule calls for completion in a year.

Indiana Gets Stamping Plant

Fisher Body Division of General Motors Corp., Detroit, will build a stamping plant near Marion, Ind. This is the second new body plant to be included in GM's $500-million capital expenditure program. James E. Goodman, general manager of Fisher Body, announced (STEEL, July 11, p. 73) that a stamping plant would be built at Mansfield, O. The Marion plant will contain about 1,776,000 sq ft of floor space.

Snyder Tool Enlarging Plant

Snyder Tool & Engineering Co., Detroit, has started work on a $500,000 expansion program. To make automation machines and special machine tools, it will increase floor space 50 per cent. Many transfer-type machine tools that the company has delivered recently to the automotive industry have been up to 180 ft long and cost more than $1 million. H. N. Maynard, president, predicts that similar machines in the next few years will be up to 250 ft long.

Steel Castings Firm To Move

Alloy Steel Casting Co. is preparing to move from Willow Grove, Pa., to its new plant at Southampton, Pa. New equipment and facilities will double its capacity for the production of sand castings made of corrosion and heat-resistant stainless steel.

Bearings Firm Doubles Space

New Hampshire Ball Bearings Inc., Peterboro, N. H., is doubling manufacturing space with a $350,000 plant. The firm assembles small precision bearings used in fine instruments.

Rheem Enters New Field

Rheem Mfg. Co., New York, producer of a wide range of products, including steel shipping containers, is entering the reconditioned drum field. The company will begin operations in the San Francisco Bay area and in Southern California.

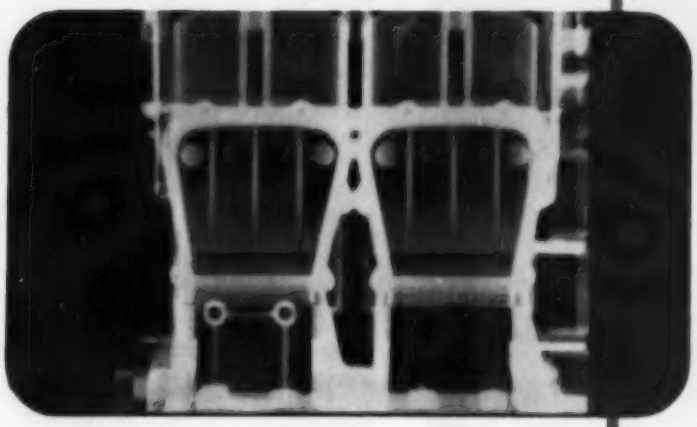
Timken To Buy Equipment

Timken Roller Bearing Co., Canton, O., will expand its Bucyrus, O., plant facilities at a cost of about $850,000. This appropriation brings the firm's expenditures for expansion of that plant to more than $10 million. Equipment scheduled for purchase under the new appropriation will be ordered in the near future.

Borg-Warner Diversifies

Borg-Warner Corp., Chicago, has entered the materials handling field by acquiring Brooks Equipment & Mfg. Co., Knoxville, Tenn., maker of hoist-bodies for standard truck chassis and containers for all kinds of bulk loads. The Brooks firm is operated as a subsidiary under the direction of J. H. Ingersoll, president of the new firm as well as Ingersoll Products Division, Ingersoll Kalamazoo Division and Ingersoll Conditioned Air Division. R. F. Schutz, manager of the In-

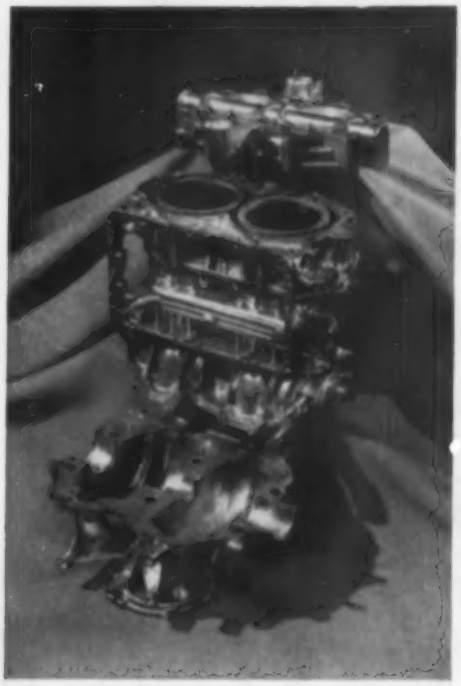
Dependability is a must . . . so



RADIOGRAPHY keeps its eye on production

Radiography . . .

another important example of Photography at Work.



SALES of outboard motors have gone up dramatically. New high power, smoothness, and quiet have all helped. But chief of their outstanding virtues is dependability.

This quality is guarded by radiography. It insures soundness of castings—sees that weakness is not lurking in a hidden flaw.

Radiography cuts cost, too, when x-rays reveal unsatisfactory castings before machining is begun.

Today radiography is playing a greater and greater role in good foundry operations. It frequently points the way to better casting methods . . . makes sure only sound castings are delivered.

If you'd like to know how radiography can help you, get in touch with your x-ray dealer. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

Kodak

EASTMAN KODAK COMPANY, X-ray Division, Rochester 4, N.Y.

gersoll Kalamazoo Division and vice president and manager of Wausau Mfg. Co., subsidiary of Borg-Warner Corp., is vice president and general manager of Brooks Equipment.

Union Twist Drill Makes Change

Union Twist Drill Co., Athol, Mass., has taken over the operation and management of its West Coast operations, formerly under the direction of E. B. Sutton Co. Direct factory branch offices and warehouses, as well as the operation of Butterfield and S. W. Card divisions, continue at 3675 E. Olympic Blvd., Los Angeles; 121 Second St., San Francisco; and 558 First Ave. S., Seattle.

Opens New York Branch Office

Precision Drawn Steel Co., Camden, N. J., established New York metropolitan district offices at 56 Main St., Millburn, N. J. In charge is James J. Holloran, former manager of the Cold-Finished Bar & Tube Division, Mapes & Sprowl Steel Co., Union, N. J.

Thompson Products Buys Firm

Thompson Products Inc., Cleveland, manufacturer of aircraft, electronic and automotive parts, acquired Karl-Douglas Associates Inc., Hawthorne, Calif., maker of hydraulic and pneumatic cylinders and valves.

GE To Build Service Shop

General Electric Co., Schenectady, N. Y., will construct a multimillion dollar apparatus service shop on Tonnelle avenue, North Bergen, N. J. It will provide electrical maintenance facilities for New Jersey and New York. Operations now in the greater New York city area will be moved in.

National Valve To Expand

Henry E. Haller Jr., newly elected executive vice president and general manager of National Valve & Mfg. Co., Pittsburgh, will spearhead an expansion program for the firm. Following transfer of Navco assets to new owners, headed by Frederick W. Richmond,

these officers were re-elected: Henry E. Haller Sr., president; J. R. Nicklin, vice president; C. G. Grabe, vice president-engineering; J. S. Land, vice president-sales. R. C. Williams was named secretary-treasurer.

Kaiser Opens Branch Office

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., opened a branch sales office at 108 N. Main St., South Bend, Ind., under the management of R. D. Murphy. The firm moved its Baltimore branch office to 5017 York Rd.

Buys F. Jos. Lamb Co.

F. Jos. Lamb Co., Detroit, manufacturer of automation equipment, special machinery and multiple drill heads, has been purchased by a local financial group. Officers are Alfred C. Ryan, president; J. K. Rye, vice president and general manager; Arthur Wrock, secretary; and A. C. McLee, treasurer.

Fansteel Expands in West

Fansteel Metallurgical Corp., North Chicago, Ill., now has a plant at 1015 Hope St., South Pasadena, Calif., for the assembly of selenium rectifiers. Stocks of tantalum capacitors will be carried. R. T. Morrison is manager. Gorman Co. is distributor in ten western states.

Plans To Build Plant in Peru

Harbison - Walker Refractories Co., Pittsburgh, will build a plant in Lima, Peru, to produce fireclay, silica and basic refractories. Its associates are Cerro de Pasco Corp., New York, and Miguel Dammert Muelle, San Isidro, Peru. Harbison-Walker will have the majority interest in the company, Refractories Peruanos, S. A.

Federal-Mogul, Bower Merge

Bower Roller Bearing Co., now merged into Federal-Mogul Corp., will operate as Federal-Mogul-Bower Bearings Inc. G. S. Peppiatt, president and chief executive officer of the merged company, says that Bower will be operated as a division of the new company and will retain its basic organizational

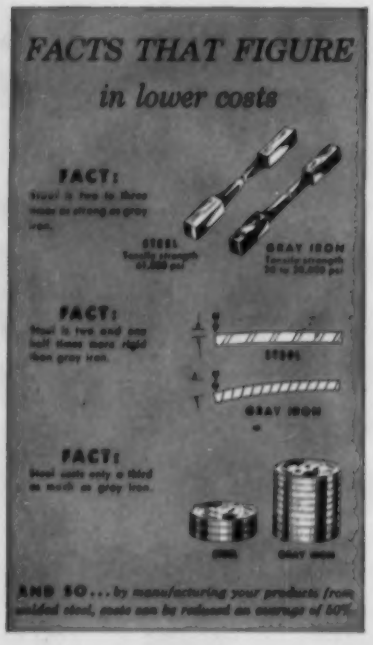
HEVI DUTY FURNACES
In Tool Room Service

Are Versatile . . . . .
and Dependable

● These Hevi Duty Box Furnaces at the A. O. Smith Corp. of Milwaukee, Wisconsin are used for hardening production tools that vary in weight from a few ounces to several hundred pounds. Hevi Duty Furnaces provide the uniform temperatures needed for precision heat treating.

Send for bulletins HD-341 and HD-441

HEVI DUTY ELECTRIC COMPANY
HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY
DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS
MILWAUKEE 1, WISCONSIN



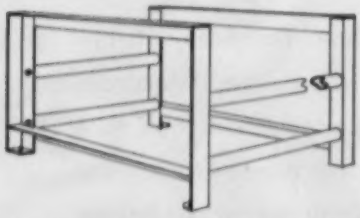
HOW WELDED STEEL BUILDS STRONGER PRODUCTS

... for lower cost

BY using welded steel design, material costs can be reduced up to 86% compared to using gray iron.

The amount of saving depends on how well the design utilizes steel's superior strength and rigidity.

The substantial saving in material cost leaves a wide margin in which to fabricate the steel by welding and still realize overall savings of 50% on many types of products.



Costs 23% Less. *Base for machine weighs 50% less than former casting construction, is stronger, more rigid, neater in appearance. Fabricated in only 6 hours . . . former design took 14 hours.*

How to design in steel

Handbook and bulletins on welded design are available to designers and engineers by writing:

THE LINCOLN ELECTRIC COMPANY
Dept. 1607
Cleveland 17, Ohio
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

structure. H. Gray Muzzy is chairman. S. A. Strickland is vice chairman of the board of the new company. Chief products of the Detroit firms are: Federal-Mogul, sleeve and ball bearings; Bower, straight and tapered roller bearings.

Rockwell Mfg. Expands Plant

Rockwell Mfg. Co., Pittsburgh, is constructing a 104,000-sq-ft parts plant in Russellville, Ky. Cost of the plant is estimated at over $1 million, exclusive of production equipment.

VACATIONS

Plant and offices of **Whiting Corp.**, Harvey, Ill., will be closed the first two weeks in August for vacations. A skeleton force will handle emergency orders and incoming materials.

Automatic Transportation Co., Chicago, is closing its plant the first two weeks of August for vacations and will reopen Aug. 15. A skeleton crew will provide emergency service.

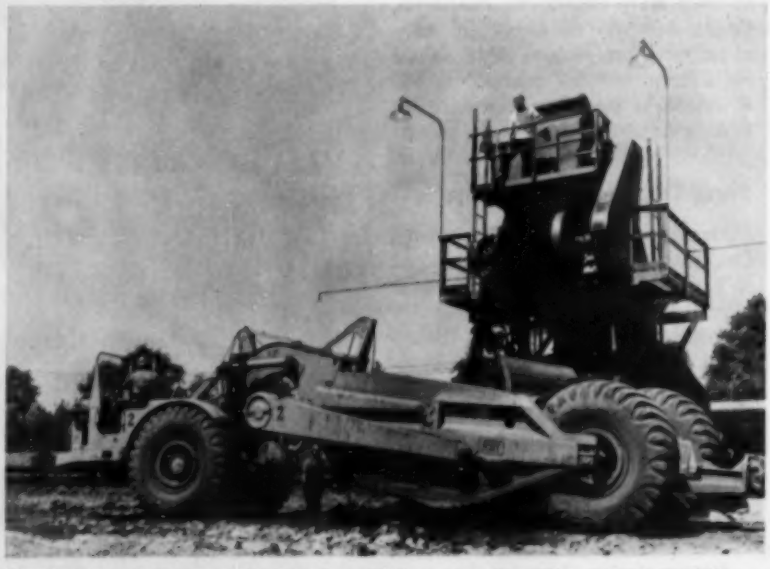
National Research Corp., Newton Highlands, Mass., has closed its plant (July 30 through Aug. 13) for vacations.

ASSOCIATIONS

American Iron & Steel Institute, New York, elected two vice presidents: W. W. Sebald, president, Armco Steel Corp., Middletown, O.; and William M. Akin, president, Laclede Steel Co., St. Louis.

E. M. Krech, director of purchases, J. M. Huber Corp., was elected president of the **Purchasing Agents Association of New York.** Other officers are: W. F. Rae Jr., Mennen Co., and D. S. Gibson, Worthington Corp., vice presidents; E. B. Fielis, treasurer.

Investment Casting Institute, Chicago, has voted to affiliate with the **National Castings Council**, Cleveland. The council affords co-operative action among the as-



U. S. Steel Opens Iron Ore Storage Yard on Lake Erie

Iron ore pours from an inloading conveyor pit into an earth moving diesel unit for stocking at United States Steel Corp.'s new 170-acre Perry Bluff, O., iron ore reservoir yard on Lake Erie near the Pennsylvania state line. Railroad cars of ore from Pittsburgh & Conneaut Dock Co., about 2 miles from the storage area, are unloaded at the two conveyor pits, each with a capacity of about 1500 tons per hour. A conveyor system then dumps the ore into earth moving units for stocking. Perry Bluff was constructed to provide additional ore storage for U. S. Steel mills in the Pittsburgh and Youngstown areas

sociations, societies and institutes serving the foundry industry on matters beyond the scope of the individual groups. The institute will hold its fall meeting in Detroit, Nov. 1-3.

C. W. Stone, executive vice president, Interstate Drop Forge Co., Milwaukee, was elected president of Drop Forging Association, Cleveland.

United States Trade Mark Association, New York, elected to its board of directors Herbert E. Markley, secretary of Timken Roller Bearing Co., Canton, O.

ANNIVERSARIES

Leslie Co. is celebrating its 50th year at its present site in Lyndhurst, N. J. It makes pressure, temperature and liquid level regulators and controllers, steam and air whistles and strainers for the protection of equipment in fluid piping systems.

REPRESENTATIVES

Structo Systems Inc., Elyria, O., maker of steel framework angles, appointed these additional distributors: Wrenn Bros., Charlotte, N. C.; Wurzburg Bros. Inc., Memphis, Tenn.; Chalmers Wood, Kansas City, Mo.; Safway Steel Scaffold Co., Sioux City, Iowa; Safway Scaffolds Co. of Texas Inc., Dallas; and Alton Inc., McKeesport, Pa.

Bond Welding Service Co., Drexel Hill, Pa., was appointed distributor in the greater Philadelphia area for resistance welding materials made by WW Alloys Inc., a division of Fansteel Metallurgical Corp., North Chicago, Ill. R. H. Munn Jr. was appointed district manager of the Pittsburgh area for the division.

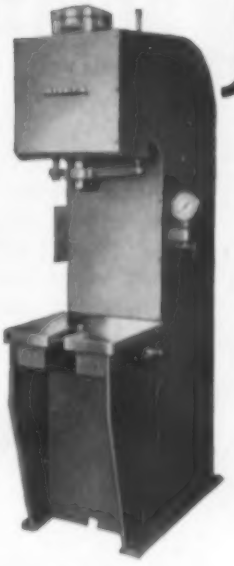
Cleveland Tapping Machine Co., Canton, O., appointed Hoffman & Heartt, Los Angeles, its representatives for Southern California and Arizona; C. F. Bulotti Machinery Co., San Francisco, for Northern California.

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES

1-TON	$ 552
2-TON	$ 627
5-TON	$1,286
8-TON	$1,581
10-TON	$1,855
25-TON	$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

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HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

MOTORIZED

COIL LIFTER

SAVES STORAGE SPACE...

HANDLES COILS FASTER... SAFER

1 Lifter Handles Both Wide and Narrow Coils With Same Speed and Economy

This C-F Coil Lifter, under control of the Crane operator handles hundreds of coils a day in a large mill... wide, narrow, and of varying tonnage. Fast, infinite adjustments of the motorized legs permit quick pick-up and set-down. Legs can be opened to any width and held... no need to open to maximum width to handle narrow coil. Maximum of 12" required between coils of any width—saves storage room.

Positive tong grip on coil tightens as lift is made... insures safe handling. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for Bulletin and complete information.

CULLEN-FRIESTEDT CO.

1308 South Kilbourn Avenue • Chicago 23, Illinois

The Facts Stood Me on My Ear!

"When I found out from the Detrex field representative that the average metalworking plant had ¼ to ⅓ of their operations tied up in metal cleaning and surface preparation, I was astonished to say the least! It started me thinking as to just what percentage of *our* operations were of that type. I found that in our plant nearly a third of all the operations had to do with metal cleaning and surface preparation. That fact not only stood me on my ear but it changed my thinking completely regarding the importance of these operations.

"The Detrex man pointed out many dollar-saving improvements we could make. For example, take degreasing solvent. Detrex Perm-A-Clor* is saving us hundreds of dollars per year because it goes further. Why? Because it's a premium solvent and at the price of regular solvent too! He also showed us ways to conserve solvent, improve product quality and even helped us train operators. He did all this without charge too!

"Maybe you're like me. Perhaps you have never stopped to consider the number of metal cleaning and surface preparation operations in your plant, or the money you might save from an overall standpoint. If not, the facts will probably startle you.

"Why don't you give the Detrex man in your area a chance to make a survey of your plant? Chances are you'll be surprised at the result. It won't cost you a cent and he may prove he can save you big money. Give it a whirl . . . you've got everything to gain . . . nothing to lose."

*Detrex Perm-A-Clor (trichlorethylene degreasing solvent) costs no more than ordinary solvent, yet it goes much further . . . far more parts degreased per pound. You can buy Perm-A-Clor in the manner most economical for your needs . . . by the drum, by tank truck or by tank car. A nationwide network of distribution and supply points provides fast delivery at all times.

Service with a Saving!

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DEGREASERS • DEGREASING SOLVENTS • WASHERS
ALKALI & EMULSION CLEANERS • DRYCLEANING
EQUIPMENT • PHOSPHATE COATING PROCESSES

Technical Outlook

LESS CHROME FATIGUE— A special high-concentration chromium plating bath containing 600 g/l CrO_3 and 4.8 g/l of sulphate reduces the fatigue limit of 266,000-psi superstrength steel less than 2 per cent after chromium plating. Plating is done at 130° F at a current density of 3 amp/sq in. Parts are baked 4 hr at 450° F after plating. Bath was described by E. J. Seyb, United Chromium Research Laboratories, Detroit, at the American Electroplaters' convention.

STRONGER MOLY WIRE—A small amount of cobalt added to a high-purity molybdenum base makes a stronger wire for electronic tube grids, says Fansteel Metallurgical Corp. It's designed to minimize breakage on grid winding machines without perceptibly changing the electrical properties of pure molybdenum.

LOW-TEMP BRAZING—A new titanium brazing process uses low temperatures with silver or silver-manganese brazing alloy. Developed by the Stainless Processing division, Wall Colmonoy Corp., Detroit, the method employs no flux. It is a form of vacuum brazing—offers a minimum of distortion.

LIGHTER REACTOR—Much of the weight and bulk of a conventional atomic reactor has been eliminated in a pilot model by nesting a liquid metal reactor inside a cylindrical heat exchanger. The reactor may solve the weight per horsepower problem standing in the way of an atomic power plant for aircraft.

FLATNESS INSURANCE—Porcelain-enamel-faced sandwich panels that will sheathe the 12-story Ford Central Staff Office Building in Dearborn, Mich., have a built-in flatness factor. It's a ¼-in. thick aluminum honeycomb immediately behind the porcelain-coated steel face. Backing up the honeycomb is 2 in. of Foamglas insulation between galvanized steel sheets. Each panel is sealed on the edges with an aluminum frame.

DYED ALUMINUM STRIP— You can buy it in coils, already anodized and colored. Available in about any color, commercial coils come in gages from 0.003 to 0.020 in., widths from ¾ to 20 in.

TELLTALE TESTING—Newer testing techniques are paying off in the automotive field. Radioisotopes measure oil and coolant leaks, reveal efficiency of filters, disclose wear. Sonic and pneumatic volume measurements give extreme accuracy in studies on carbon deposition, combustion chamber volume and engine timing.

STRENGTH FOR SHEET— The Alcoa research laboratories are about ready with an alloy for sheet, plate and extrusions which will have excellent properties in the 300 to 400° F range—a valuable product for supersonic aircraft. New Alcoa alloy X2219 is good for extrusions and forgings at 500 to 600° F. This temperature range is needed for applications in and near aircraft and automotive engines.

RADIOACTIVITY TRACES WEAR— After exposing dies used to hot extrude steel to the neutron stream of an atomic pile for two days, the tungsten in the tool became sufficiently radioactive to permit accurate studies of wear. B. J. Jaoul, Ecole Nationale Superieure des Mines de Paris, told the Boston meeting of the ASME that the method should detect wear on tools, gears, rams and even automobile tires.

Norton Co.

Rocket nozzle liners made of super refractories

Beyond the Metals

PART I

By VAN CALDWELL
Associate Editor

TEMPERATURE at the combustor of a large gas turbine reaches 3000°F. But before the hot gas hits the turbine blades it must be cooled to 1500°F; otherwise the blades can't take it.

That doesn't keep designers from talking turbine temperatures of 2000°F and higher. They have their eyes on three possibilities: 1. A small group of metals (molybdenum, tungsten, tantalum, columbium) with survival potential above 1800°F. 2. Combinations of metals and ceramics called cermets. 3. Super refractories.

Furnace Born — Super refractories have been growing up for years. Mostly they are synthetic products of the electric furnace. Greater resistance to heat distinguishes them from most of the "natural" refractories, but that's not their only or even their most valuable quality.

Some show superior wear resistance. Some are insulators; others good conductors of heat and electricity. They stand out for resistance to corrosion, or thermal shock, or oxidation. Combinations of such qualities, plus great resistance to heat, give super refractories their special importance.

- Extra copies of this article, and Part II on the carbides, borides, nitrides and other members of the super refractory family which will appear next week, are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.

Heat Aside—They find uses as abrasives, forming rolls, nozzles, containers for corrosive chemicals and parts of electrical devices where heat plays a minor role. Silicon carbide and oxides of aluminum, magnesium and zirconium have established uses as furnace linings, wear resistant parts, muffles and crucibles where heat is not the only killer.

Out on the heat frontier are materials that ten years ago were curiosities on a laboratory shelf: Tantalum carbide, zirconium nitride, cermets, coatings like molybdenum disilicide. Rocket, jet and turbine designers look to them for answers.

Outlook—The super refractories picture breaks down to this: 1. Bread and butter applications in melting, wear resistance, heat treating and fabricating. 2. Blue sky applications in aircraft engines, turbines, atomic energy, chemical processes and metal handling.

You'd expect these materials to supplement the tonnage refractories. That's their biggest field so far, but they are going much further. A few have taken the big

jump as actual substitutes for metals.

Names—Usage spreads the term "super refractory" over considerable territory, including high-melting-point ceramics, refractory hard metals and intermetallics. Some refractory makers prefer to confine the term to products of the electric furnace.

Whatever the name, it's important to realize that few of these materials are used pure. Most shapes, for instance, contain binders that modify the properties of the base material. Still, you'll find them classed by their major chemical components as oxides, carbides, nitrides, and borides and silicides.

OXIDES

Alumina, magnesia and stabilized zirconia are the big three of the oxide refractory group.

Alumina—Fused aluminum oxide (alumina) is dense, white, hard (2000 Knoop), crystalline, chemically inert. It can be formed into shapes for service up to 3450°F. Thermal conductivity about three times that of fireclay brick, great resistance to wear, good electrical insulation values at all temperatures, chemical stability and resistance to flame and slag erosion are typical qualities of refractories made from it.

You'll find alumina refractories in muffles, hearths and cores for wire-wound furnaces where their long service life outweighs relatively high cost. Heat treating and enameling furnaces are two hot spots in which they have proved especially useful.

Many aluminum oxide cements and castables are available for lining, patching and bricklaying, especially in the hottest zones of metal-melting furnaces, and for embedding resistance wires in appliances and furnaces.

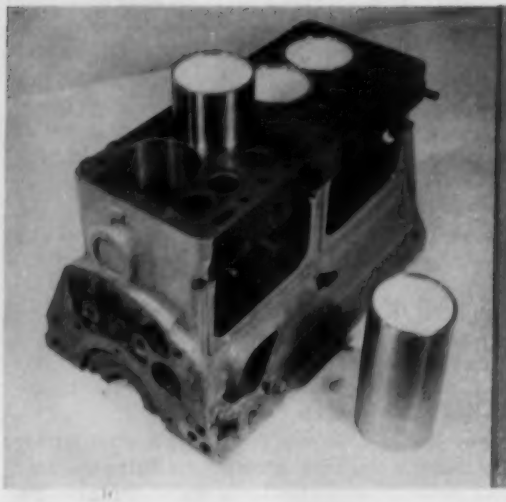
Insulation — Alumina bubbles and grain make excellent high-temperature insulation. Bubble brick, another type of alumina refractory, combines insulating ability with ability to resist direct flame impingement at above 3200°F.

Several builders offer bright annealing atmosphere furnaces lined with this brick which contains virtually no reducible oxides. It's a good thermal insulator at high temperatures, and is light in

Where Super Refractories Are Used

	Aluminum oxide	Beryllium oxide	Magnesium oxide	Zirconium oxide	Boron carbide	Silicon carbide	Ti, Zr carbides	Boron nitride	Cr, Zr, Ti borides
Furnace shapes	X		X	X		X			
Arc and induction furnace linings		X	X	X		X			
Crucibles	X	X	X	X	X	X	X	X	X
Heat exchangers, recuperators	X			X		X			
Nuclear reactors		X			X	exp			
Wear-resistant parts	X				X	X	pos		X
Furnace muffles	X					X			
Refractory coatings	X			X		X			
Electrical resistors, heating elements	X		X	X	X	X			
Brazing and welding fixtures						X			
Alloy additions					X	X			
Jet engine and rocket parts	X	X		X	X	X	X		X
Roller hearth rolls				X		X			
Acid spray nozzles						X			
Molten metal nozzles, pumps, piping			pos	X		X	pos		X
Sand blasting nozzles					X	X	X		
Burner tips						X			
Abrasives	X			pos	X	X	pos	pos	
Metal cutting tools	exp	X				X	X		
Gages					X				
Metal forming rolls					X				
Mold washes, high temperature lubricants				X				X	
Electrical insulators	X	X	X			X		X	
Thermal insulation	X			X	X			X	
Sheet metal and wire guides						X	pos		
Bearings, bushings	X				X	X	X		X
Dies							pos		X

Key: pos = possible; exp = experimental



REFRACTORINESS PLUS

A Hough Payloader handles crude silicon carbide in Norton Co.'s Crystolon Plant. It's dusty work with one of the most abrasive of materials.

In September, 1948, the machine's 4-cylinder Waukesha engine was fitted with aluminum oxide (Alundum) cylinder liners. Since then it has logged 8618 hours of operating time and is still good for long service. Based on engine rpm, that equals 258,500 miles of wear on an automobile engine.

The engine has been rebuilt six times, but the cylinder liners show no measurable wear. Valves, valve seats and bearings wore out. Equivalent service life for a standard cast iron block is about 1200 hours.

With super refractories, the plus values often count for more than sheer refractoriness.

weight, especially important because the furnaces are shipped with the brick installed. It's also used in powder metallurgy furnaces, gas synthesis generators, electric resistance and reverberatory furnaces.

Magnesia—Most of the magnesia refractories are tonnage products, but fused magnesium oxide (periclase) is properly grouped with the super refractories.

Fused magnesia brick has been used successfully for the linings of both ferrous and nonferrous metal melting furnaces, for crucibles and for a nitrogen fixation furnace operating at 4000°F. It has great resistance to basic slags, but cannot be used in reducing atmospheres above 3100°F. The burners in your electric stove are probably sheathed in fused magnesia because of its high resistivity and thermal conductivity.

Zirconia—Stabilized zirconia is a relative newcomer, but its use is growing fast. Because pure zirconium oxide changes crystal form at about 1800°F with great volume contraction, its use is limited.

By fusing it with about 5 per cent CaO, it maintains its low temperature crystal form to 4900°F. The resulting product has twice the density of fireclay brick, but is a much better thermal insulator and will carry a considerable load under high heat.

Steelmaking—The cost is still high for stabilized zirconia refractories, but their thermal conductivity at high temperatures is so low that they can be used profitably for extreme applications in metal melting, including steel and platinum melting.

One of the tricks in the continuous casting plant of Atlas Steel Co. Ltd. at Welland, Ont., is a stabilized zirconia nozzle which is not wetted or eroded by the steel. After leaving the nozzle the molten steel is conducted to the mold through a zirconia tube. The metal does not solidify because of the low thermal conductivity of the refractory.

Beryllia—Beryllium oxide is a tough ceramic material which has already found a number of uses: Linings for rocket combustion chambers, jet engine turbine parts, aircraft spark plug insulation, high-temperature electric furnace linings. Beryllium oxide can be made gas tight at 4000°F, and has operated at 3600°F both in vacuum and under pressure in the presence of carbon, carbon monoxide and hydrogen without reaction.

Resistance to alkali attack at high temperatures makes it suitable for high-purity melting. Moreover, its thermal shock resistance is superior to quartz. Although it is one of the hardest of refractories, it can be machined to shape after casting or pressing.

Beryllia is readily dissolved by acids, even dilute ones. It is volatile in the presence of moisture at elevated temperatures, a property which ruled it out when it was tried as a moderator in an atomic pile.

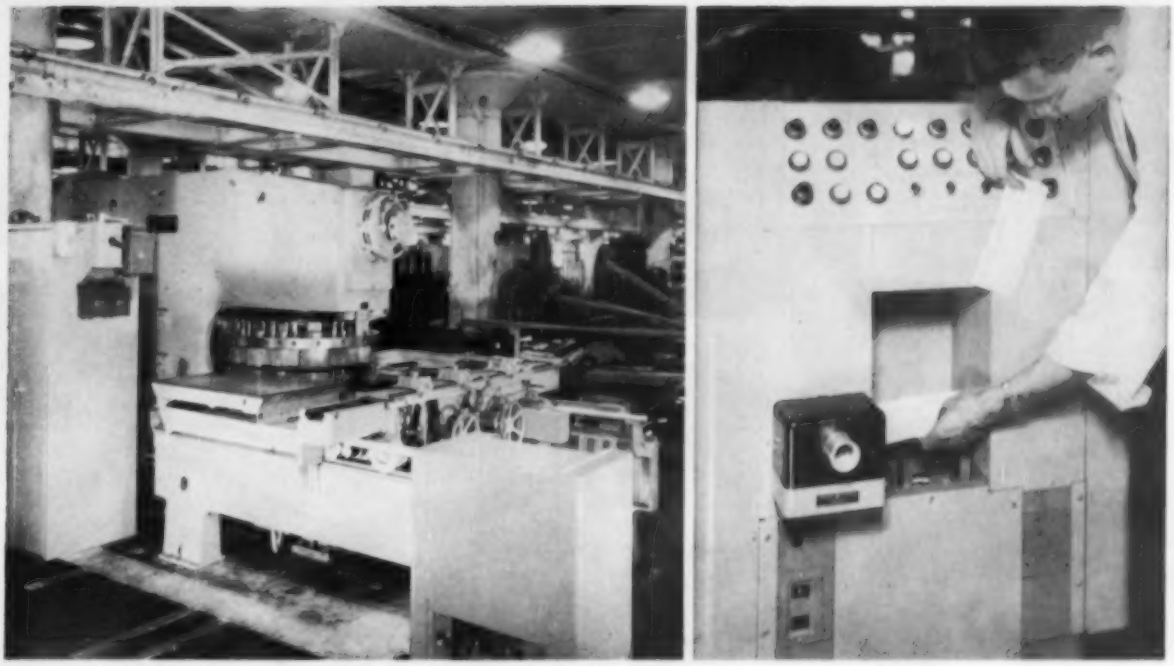
High Purity—When a refractory has physical properties that block its use, greater purity won't necessarily improve the situation. Many can be obtained 97 to 99 per cent pure, but refractory mixtures equivalent to alloys frequently produce better results.

One such complex product widely used in glass melting tanks and electric metal-melting furnaces is fusion-cast mullite ($3Al_2O_3.2SiO_2$). It has excellent resistance to heat shock, low thermal conductivity and stands up well to many slags and molten metallic oxides. Some varieties can be used to 3200°F.

Magnesia - alumina, magnesia-chromia, and zirconia-alumina are other complex oxide fusions in the experimental stage that show promise for metalworking applications.

Most Basic — Fused lime, although it melts at about 4600°F and is the most basic refractory, can be used only in dry atmospheres because it slakes. Fused thoria, dense as lead and radioactive like uranium, is not likely to be available in quantity for obvious reasons.

It could have real importance in melting problem metals because it is the least reactive at high temperatures of all the oxides and melts at 5500°F. Thoria crucibles have been used on a small scale for melting titanium, zirconium and thorium. Hafnium oxide, another rare one, is a lot like zirconium oxide, but maintains a stable crystal form to 3100°F.



This turret punch press is turning out nearly twice the work it once did. Operator feeds it a stack of cards, loads the sheet and steps back

Punched Cards Automate This Press

AUTOMATIC CONTROL of machines from punched-card information is out of the laboratory stage. General Electric Co. is marketing a system which can run a number of machines in the factory.

Already proving itself on a Weidemann turret punch press in GE's Philadelphia works, the control is primarily for machines which involve point-to-point positioning between work cycles. Punches, drill presses, shears, riveters, placement machines are examples.

Simple and Practical—GE put design emphasis on simplicity, using proved methods where possible. The control uses a business machine card reader to activate a positioning control system.

At least three machine motions can be accurately positioned to ± 0.010 in. without difficulty. Accuracies of ± 0.001 in. can be obtained with increased care in the design of the machine-control combination. On some jobs a fourth motion is possible.

The control also can provide for functions like turning off a coolant pump, selecting a different tool or telling the operator when he must do a manual operation.

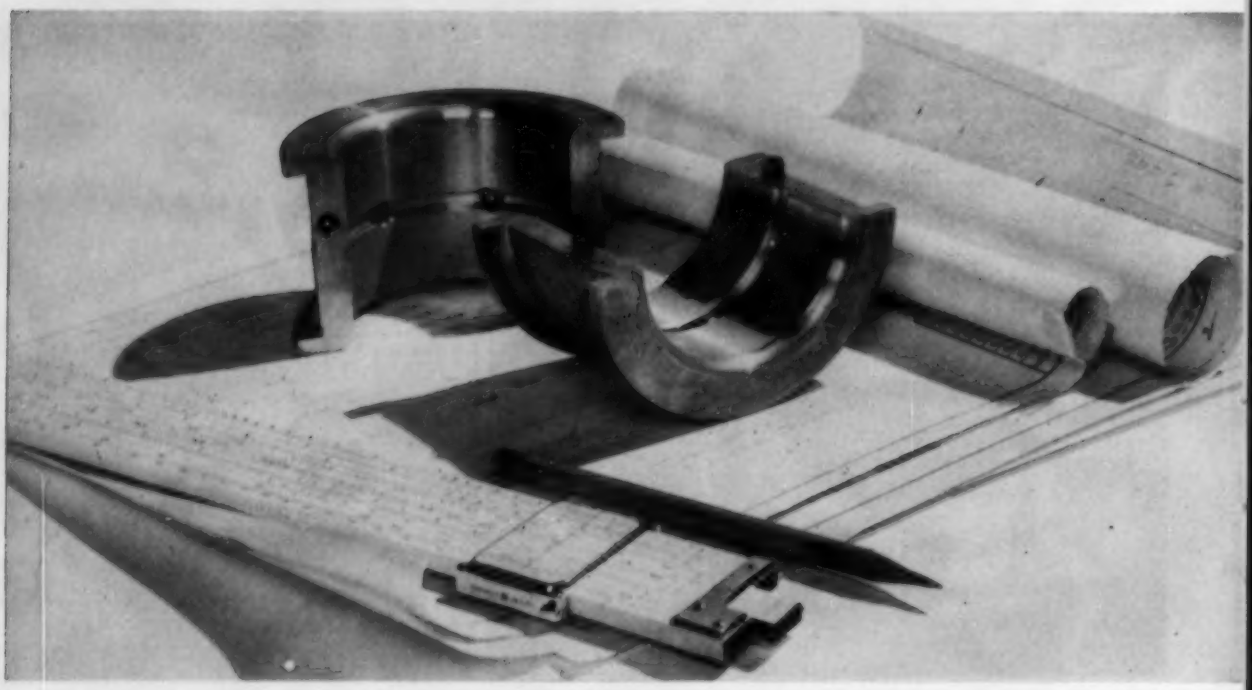
First Application—The first production model on the Wiedemann press punches formed holes in flat steel sheets for low voltage switchgear equipment. Holes must be located in two dimensions. Since a number of differently shaped holes are needed, the control must select the proper punch from the 32 on the turret.

In-and-out motion has a travel of 48 in., the crosswise motion, 80 in. The flat sheet is held by clamps on the crosswise motion and located by stops which represent the zero index point for each motion. Doing the job manually, the operator had to position the table with handwheels, select the punch by moving the turret and then punch the hole.

Easy Now—With the numerical punched card control system this slow and fatiguing job has been eliminated. The operator places a stack of cards into the reader and initiates the cycle.

The first card directs the table motion to the loading position and stops the machine. Then the operator clamps the steel sheet on the table and again initiates the control. From that point, the reader will go through the stack of cards automatically, performing the exact function that was punched on each card.

The last card directs the machine to the unloading position. An end-of-run light indicates that all operations are completed. The operator removes the piece and cards, and he's ready for the next one. Any stops during the sequence can be programmed easily.



WHICH SLEEVE BEARING?

A Guide to Bearing and Bushing

SLEEVE BEARING USERS have a lot in common with the small boy at the candy counter. With so much goodness to choose from, the "best" looks like a matter of opinion.

Fortunately, bearing buyers have better guides to go on. Often it's a matter of neatly balancing physical requirements (yield strength, corrosion resistance, etc.) against cost. Extreme conditions sometimes point directly at one kind of bearing, but usually there's a wide range of choice.

Take Your Pick—Six types of sleeve bearing alloys are in common use today: Babbitt, copper-lead, leaded-bronze, bronze, silver and aluminum. They come in a variety of forms and surfaces, sometimes backed or overlaid with other metals.

Some of their properties are acquired from the ways they were produced, which include several kinds of casting, electroplating and sintering.

Starting point for choosing bearings and bushings is the service required. Here are some factors you should consider:

Wear resistance
Yield strength (load carrying capacity)
Corrosion resistance
High-speed performance
Conformability
Ability to seat
Seizure resistance

Wear Resistance—This is an important property of the bronzes. High hardness of copper-tin alloys accounts for it. Bronzes are often used for this reason, but the bearing must be kept free of dirt to avoid abrasive wear, and there will be more wear on the shaft than with a softer alloy.

Wear is usually due to dirt. Where wear is a primary factor, a bronze bearing, a hard shaft and clean oil are indicated. Where a soft shaft is used and dirt cannot be avoided, it is often desirable to use a babbitt bearing; the babbitt wears but is inexpensive to replace. This avoids reconditioning or replacing the shaft.

Yield Strength—A bearing is limited by its capacity to carry loads. The alloy must not deform or pound out. High yield strength of the bronzes allows them to carry a heavy load. Of course, if a large bearing area can be used to obtain a low unit load, other bearing materials may be used.

Corrosion Resistance—The bearing must not corrode. Hot, uninhibited oil is particularly corrosive to lead. Modern oils contain additives to overcome this corrosion. With use, additives lose some of their inhibiting properties so corrosion of lead is still a problem.

Tin and aluminum have good corrosion resistance to hot oils, al-

PART I

Bearing Materials

By J. B. MOHLER
Consultant
Newcastle, Pa.

Choice

though it is unlikely that these materials would be selected for this property alone.

High-Speed Performance—If an oil film could be maintained at all times and if dirt could be kept out of the bearing, speed would not be a factor. At high speeds a material is required that will not generate excessive heat if the oil film is momentarily broken or if dirt gets between the journal and the bearing. Alloys of lead and tin are best for high-speed applications.

Conformability—Alloys of lead and tin, including the overlay alloys and the babbitts, have the best ability to conform under conditions of local overloading owing to misalignment, shaft deflection or foreign particles that get to the bearing surface. A related property is embeddability. The soft alloys will engulf a particle of dirt so that it will not be held against the journal surface to generate heat and promote failure in the bearing.

Ability To Seat—The bronzes and the aluminum alloys have a greater ability for the entire bearing to move than do the babbitts. The babbitts will conform to the shaft but only by movement of material. Under some conditions this is desirable; the bearing deforms so that unit loading is reduced by spreading it over a larger area. In other cases the condition requiring this conformance may be local overloading that can result in fatigue and early failure of the bearing.

Mr. Mohler formerly was director of research for Johnson Bronze Co., Newcastle, Pa.

The bronzes and aluminum alloys have an ability to seat without local deformation. Under conditions of misalignment the entire bearing will tend to bend into place so that the final shape will not be greatly distorted.

Seizure Resistance—Some alloys seize more readily than others. This property depends on the ability of the alloy to remain wet with oil and the ability to run without welding to the shaft after the oil film is broken. Lead and tin alloys have the best seizure resistance, and, in general, the lower melting alloys are more seizure resistant than the higher melting ones.

Because no one bearing material combines all these qualities in ideal proportion, combination bearings are common. For example, sleeve bearings are made with a high-strength metal backing and a low melting point lining for high speeds under heavy load. A hard bearing may be indented and the indentations filled with a soft material to combine strength with low friction and embeddability.

Many Materials—The special requirements of bearings have fostered a group of bearing materials ranging from wood to glass, but the commonest are metals. In terms of speed and load-carrying qualities, the usual metal bearing materials may be rated in this order:

High Speed		Heavy Load
1	Babbitt	6
2	Copper-lead	5
3	Aluminum	4
4	Leaded bronze	3
5	Silver	2
6	Bronze	1

In general, these qualities are related to hardness and melting point. High-speed properties are embeddability, conformability, low friction, oiliness and seizure resistance. Heavy load properties are load capacity, fatigue and wear resistance.

The Babbitts—These alloys of lead and tin have high-speed properties. There are many variations. SAE alloys widely used are shown in Table 1.

If corrosion resistance is desired, the tin babbitts are chosen. If maximum fatigue strength is required, SAE 15, lead-base babbitt, sometimes referred to as arsenic-babbitt, is chosen. SAE 13 is soft and ductile compared with other babbitts and may be employed for high-speed applications where the maximum in surface properties is desired. Intermediate in properties between SAE 13 and SAE 15 lie SAE 14 and the three tin-base babbitts.

Backed Babbitts—Babbitt on a cast iron back is an improvement over the original poured babbitt bearings. Thin babbitt linings are used, and precision bearings are made so that no scraping-in is required. If the babbitt should be

Table 1—Lead and Tin Bearing Alloys

S.A.E. No.	Tin	Lead	Antimony	Copper	Arsenic
10	90	...	5	5	...
11	87	...	7	6	...
12	89	...	8	3	...
13	5	85	10	...	...
14	10	75	15	...	...
15	1	83	15	...	1

worn away, graphite in the cast iron acts as a solid lubricant.

Babbitt on a bronze backing is an old and popular combination of metals, uniting the properties of babbitt with the convenience of precision fitting. An electroplated tin overlay on large bronze piston pin bushings is used as a break-in surface.

Indented Bearings—For some applications the bronze backing is indented and the indents are cast full of babbitt. The bearing is then machined to present a gridded surface. This provides a strong backing with the journal directly supported by the bronze over part of the area. At the same time, it's exposed to a large percentage of babbitt for low friction and embeddability.

Babbitt on steel is a popular modern construction available in many lead-base and tin-base alloys. Fatigue life is greatly increased by the use of a thin babbitt lining. Microbearings are being manufactured with a babbitt lining 0.002 to 0.005 in. thick.

The Copper Alloys—Typical copper alloys are shown in Table 2. Bronzes are at the top of the table, the leaded bronzes in the middle and the copper-leads at the bottom. Alloys at the top are for heavy loads, those at bottom, high speeds.

Alloys 1 to 4 are essentially bushing alloys used where low wear and heavy load capacity are desired, such as for a piston pin bushing. Such alloys, used with a hard shaft, are subjected to loads up to 10,000 psi.

General Purpose — Alloys 5 and 6 are general-purpose types containing a moderate amount of tin for strength and a moderate amount of lead to add surface properties. They can be used at heavier loads than the copper-leads and at higher speeds than the bronzes or leaded bronzes with high tin and low lead content, but they are essentially for steady load conditions. They are generally lubricated by wick, oil cup or forced feed; there is little likelihood of loss of lubrication due to rupture of the oil film.

Alloys 7 to 10 contain enough lead to add considerably to embeddability, seizure resistance and low friction. They're known as bearing alloys or high-speed bushing alloys. They are commonly used for high speed and unsteady loads under conditions where the speed of the bearing and the clearance help maintain the oil film (hydrodynamic lubrication). The alloys containing tin have the greatest strength; those containing high lead and no tin have the best surface properties.

Table 2—Typical Copper Bearing Alloys

No.	Copper	Tin	Lead	Zinc
1.	90	10		
2.	88	10		2
3.	80	10	10	
4.	88	4	4	4
5.	83	7	7	3
6.	85	5	9	1
7.	70	10	20	
8.	80	5	15	
9.	75		25	
10.	65		35	

Backed Bronzes—Bronze on steel is used where a heavy load, precision bushing or bearing is required. In some applications the bronze is indented with hemispherical, oblong or diamond shapes to act as multiple reservoirs to hold oil and to collect dirt. In other applications the indentations are filled with graphite to act as a solid lubricant.

Copper-lead on steel is used for relatively heavy loads and speeds that require a strong bearing with a considerable amount of lead for surface properties.

Where loads are heavier than copper-lead on steel will take, an overlay will prolong the fatigue life or increase the load capacity. The overlay usually consists of an electrodeposited lead-tin-copper alloy, 0.001 in. thick. By means of electrodeposition it is possible to produce a thinner, precise lead alloy surface than by casting methods. But a similar bearing is made with a cast overlay 0.001 to 0.003 in. thick on a sintered copper-nickel alloy on a steel back. Electrodeposited tin overlays on copper-lead have also been used.

The Aluminum Alloys—Two aluminum alloys are becoming popular as bearings for internal combustion engines. One is an aluminum-tin alloy containing small amounts of copper and nickel as hardeners. The other is an aluminum-silicon alloy containing a small amount of cadmium. There is little difference between them. They are roughly in a class with the copper-leads and are replacing them in some cases because of their greater load capacity and adequate surface properties.

Aluminum on steel is a relatively new bearing construction that is proving to have good surface properties and greater load capacities than the copper-leads. It is manufactured without an overlay, with a lead-tin overlay and with a tin overlay.

Silver—Silver is used for high-speed and heavy-load aircraft bearings. The silver bearing with a lead-alloy overlay and a steel back is widely used. It will carry the heaviest loads at high speeds. Originally, the overlay consisted of a diffused lead-indium alloy, but this has been extensively replaced by lead-tin. A silver grid bearing with lead-tin in the indentations and a lead-tin overlay is also being manufactured.

This is the first section of a two-part article on sleeve bearings and bushings. Part two will appear in next week's issue of STEEL.

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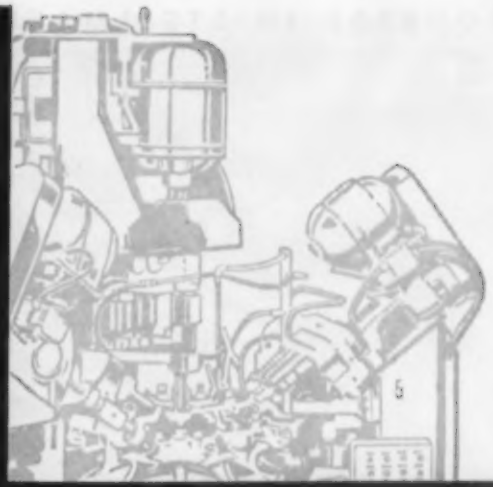

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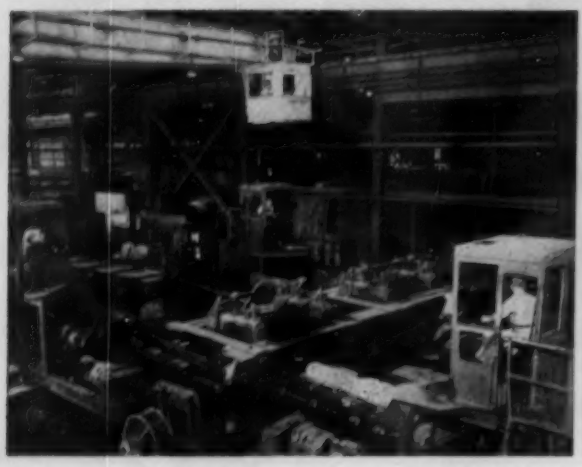
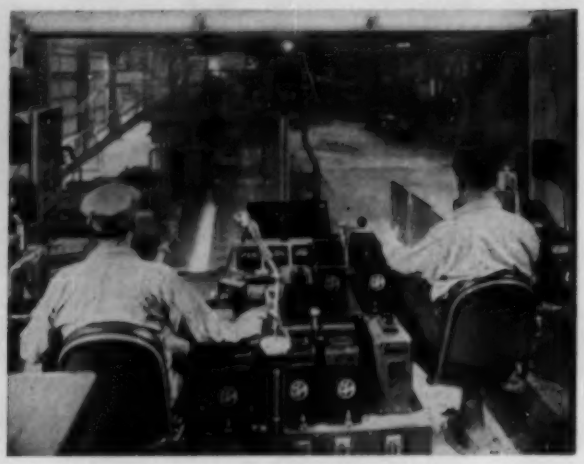




Key move in the latest expansion was replacing the old 22-in. tilting mill with a 32-in. blooming mill. Now they can pour 700-lb ingots instead of 2500-lb ones and improve operation yields

Prairie Steel Plant Still Growing

Thirty years in a continuous expansion program, Sheffield Steel, Kansas City, Mo., is pretty well used to construction hubbub. The end isn't in sight

By THOMAS F. HRUBY
Associate Editor

KEEPING UP with its growing market is a full-time job for the Sheffield Steel division of Armco Steel Corp., Kansas City, Mo. Start talking about its expansion program and Sheffield officials probably will ask, "Which one?"

Sprawled out on 264 acres in a valley to the east of Kansas City its modern plant has a product diversity that could come close to filling the bins of any steel warehouse. That kind of product mix involved about 30 years of expansion and modernization with hardly a breather.

The Beginning—Sheffield started as the Kansas City Bolt and Nut Co. in 1888. Its products were special bolts and nuts for the railroads whose tracklayers were feverishly opening up the West. Bolts and nuts are still big business, but so are wire products, grinding balls, bar joists, long span joists, forgings, merchant shapes, structurals, reinforcing bars, welded wire fabric, track spikes and rivets.

Sheffield also operates a large, fully-integrated plant at Houston and a smaller steel-producing plant at Sand Springs, Okla.

Being hundreds of miles from big steelmaking centers seems to have accentuated Sheffield's pioneering spirit. Taking advantage of available scrap, the company became the first to use a 100 per cent scrap charge in open hearths. That was 1920. Last year Sheffield added its newest "first"—completely automatic screwdown positioning control on its new 32-in. blooming mill.

Just Good Business—"If we've pioneered anything along the way, it happened to coincide with our appraisal of the best way to do business in this area," commented F. C. Herbster, division manager.

with 4-SIDED welded steel enclosure

another H-W Metalkase development

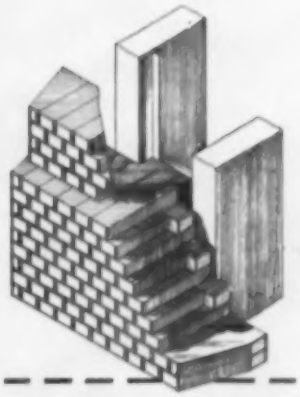
HARBISON-WALKER

metalkase

steel-encased, chemically-bonded basic refractory

Since the time of the Maccallum invention, more than forty years ago, the original metal-encased basic brick introduced by Harbison-Walker has been manufactured with many noteworthy improvements.

METALKASE, tried and proved in its newest form, is completely enclosed in 22 gauge steel on all four contact sides. The magnesite-chrome refractory rigidly controlled for highest quality is fully formed under great pressure before it is encased. Firm adherence of the welded steel casing to the refractory is assured by the tight grip of the indentation.



Typical section of open-hearth furnace front wall built of METALKASE. For maximum stability steel plates are used at intervals of two to four courses vertically. These are tack-welded to steel bars which in turn extend behind the buckstay and are free to move vertically.

HARBISON-WALKER REFRACTORIES COMPANY
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General Offices: Pittsburgh 22, Pa.

That philosophy stands out in practically every Sheffield operation.

Take the melt shop. Through the years, the 1920-vintage open hearths had been expanded several times until the shop reached its present size, five 125-ton furnaces. In 1937, a scrap-charged cupola was installed to make this, in effect, a hot-metal shop.

"This 15,000 to 16,000 tons of hot metal a month, in terms of steel output, gives us the equivalent of another open hearth," Mr. Herbster stated. To the 500,000 tons of open hearth ingot capacity was added another 150,000 tons when a 100-ton electric furnace was installed in 1952. With room for three more furnaces in the electric melt shop, it's not hard to figure where future capacity will be centered.

Bigger Ingots—Ingot breakdown facilities became the big bottleneck about the time the electric furnace went into operation. The 22-in. tilting-table mill which had served Sheffield's needs so well in former years was totally inadequate. Last year, out it went. Taking its place is a Birdsboro 32-in. two-high reversing mill. Instead of ingots weighing a little more than a ton, the new mill rolls 7600 lb ingots.

Eight 16-ft soaking pits were built to handle the stepped up rolling schedules, and the six-stand 18-in. continuous billet mill was arranged in line with the bloomer. All tonnage goes through these two mills before going to the merchant mill or the rod mill.

Two operators run the new blooming mill at capacity, thanks to the automatic screwdown built by Electric Controller & Mfg. Co., Cleveland. The control helped Sheffield speed the training of operators, enabling them to concentrate on roll reversal and table manipulating.

Finishing Mills—From the billet mill, stock goes either to the rod mill, merchant mill or to an old 10-in. hand mill used only for special or small order bars. The rod mill (rated capacity, 225,000 tons per year) has 17 stands. Most of it goes into wire and wire products.

The 12-in. merchant mill is one of the latest of its kind. Rolls on each of the 12 stands are individually driven, and stands are all on movable bases. Rated capacity is about 250,000 tons.

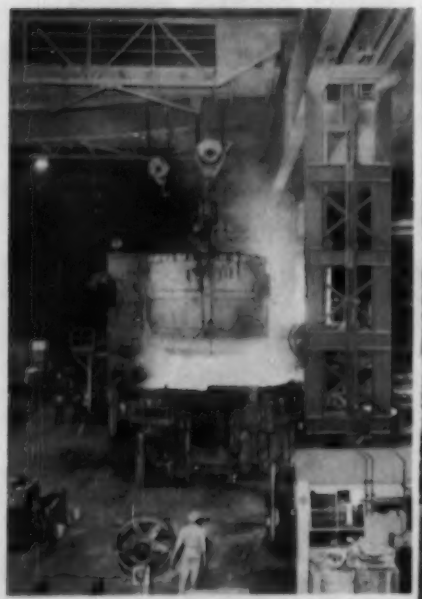
Again taking advantage of local conditions, the Kansas City plant buys up old track rails, heats them in a furnace and runs them through the 16-in. mill. This splits the rail head away from the flange, and the former is further rolled into reinforcing rod. About 25,000 tons a year can be made this way.

Other Products—A good third of all Sheffield tonnage goes into wire drawing rod. Thirty-four draw blocks take over from there, making wire from 22 gage to 1 in. The rest of the wire department includes: 68 nail machines, 3 staple machines, 16 barbed wire machines, 7 wire fence machines, 16 bale tie machines and two galvanizing units.

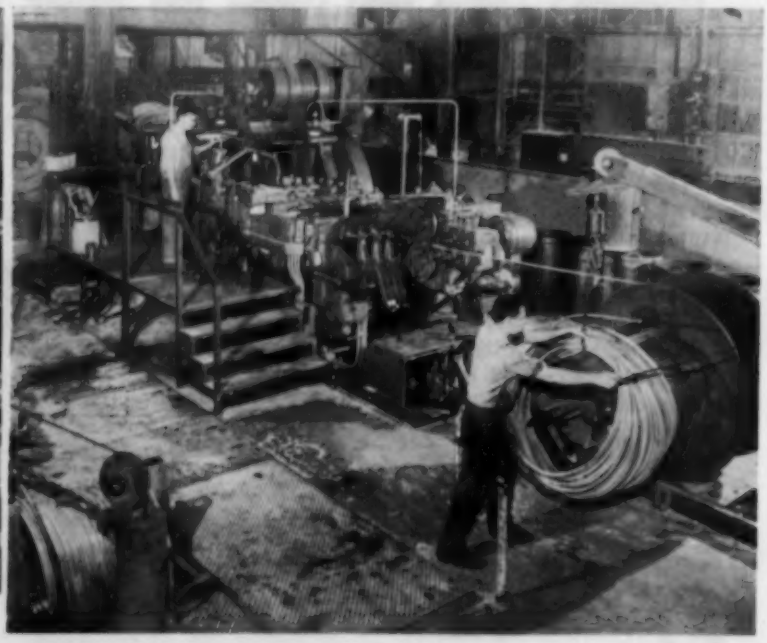
A fast-growing segment of Sheffield's business is high strength bolts for structural applications. This and grinding ball business spread Sheffield's name world-wide.

Other equipment is for hot upsetting track bolts, nuts and spikes. Automatic cold heading machines and boltmakers produce other bolts, nuts and rivets in sizes from ¼ to 2 in.

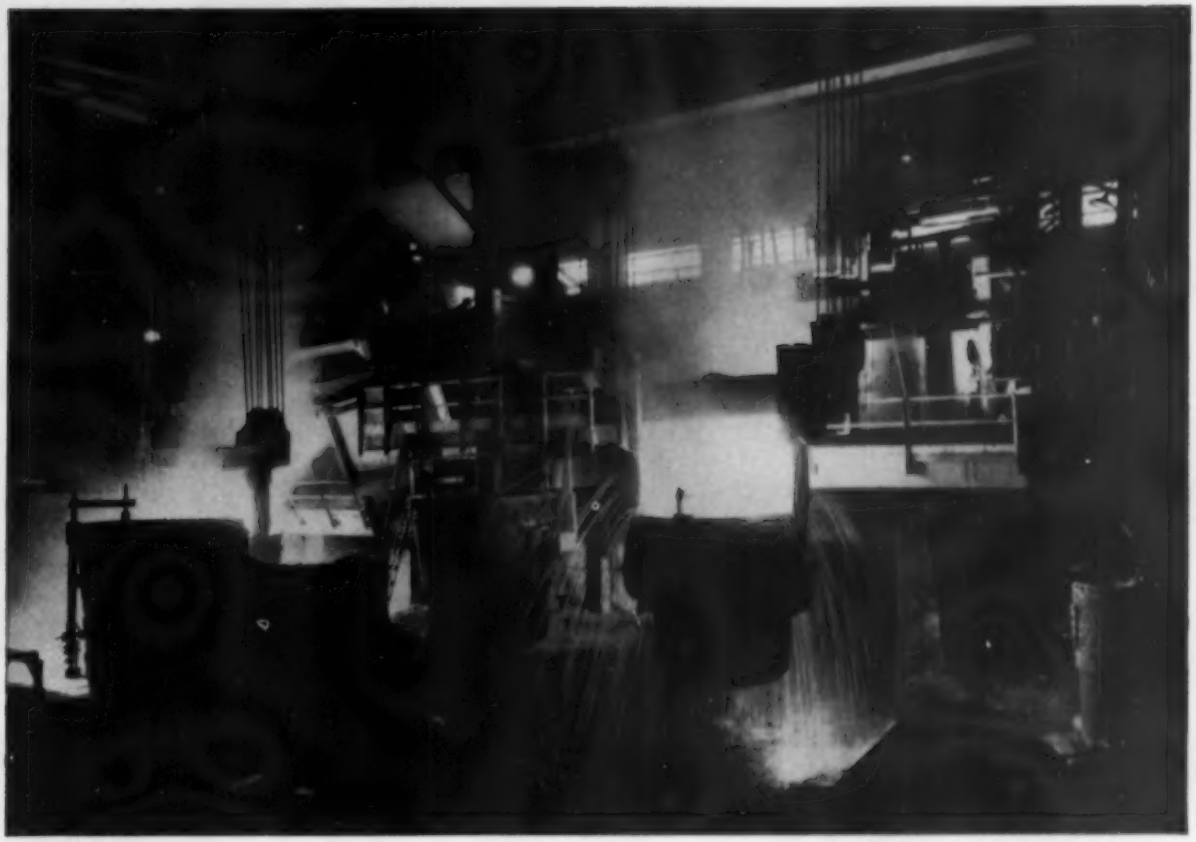
Sheffield's Kansas City operation comes close to the optimum utilization of capital equipment. As the market grows, it's safe to bet that the company will be growing just a little faster and will be ready with the steel that's needed . . . when it's needed.



Rumor has it that this 75-ton electric will soon be joined by others. There's room for three more in the electric melt shop

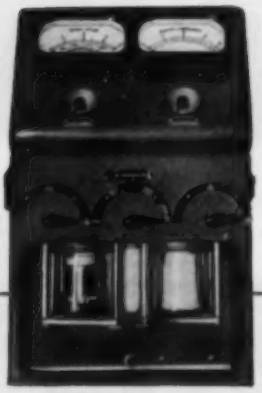


Latest addition in the finishing end is this completely automatic boltmaking machine for sizes up to 2-in. in diameter



Crucible Steel, Midland, Pennsylvania

"Cities Service Heat Prover helps make special steel, saves fuel"



THE CITIES SERVICE HEAT PROVER...

Not an instrument that you buy... but a service we supply!... FREE!

Crucible Steel Company of America is another leading steel company that has found the Cities Service Heat Prover a valuable aid in its furnace operation.

Here's what Crucible has to say about the Heat Prover at its Midland Works, one of several where it is in constant use.

"The Heat Prover has become our standard tool for the setting up and checking of combustion controls on our many furnaces at Midland. It has also helped immensely in setting up special atmospheres for special grades of steel by providing fast and reliable analyses, and has been particularly instrumental in the improvement of fuel economy. Cities Service has kept the Heat Provers in perfect running order and on many occasions has gone out of its way to help us."

You, like Crucible Steel, can achieve better results in *your* furnace operation with the Cities Service Heat Prover. Supplied and maintained free by Cities Service, it offers easy portability, rapid continuous sampling, simultaneous reading of oxygen and combustibles. For more information, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N.Y.

CITIES SERVICE

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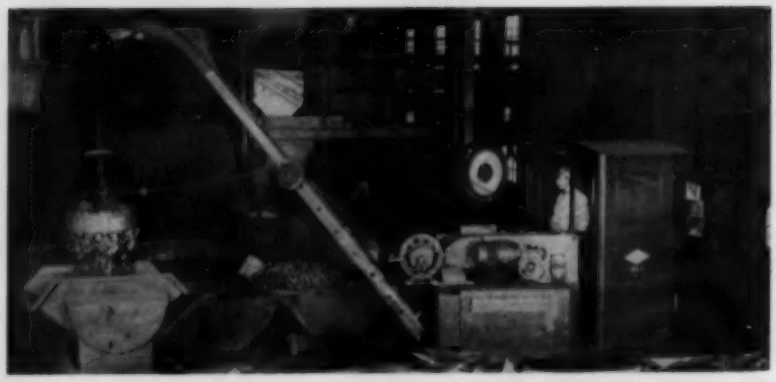
Whether out in the yard or on the charging floor . . .

One Crane Truck Does All Jobs

WHY BUY two pieces of handling equipment when one can do double-duty? That's the way a leading New England malleable iron foundry looked at the problem of handling scrap from the storage yard to the cupola.

One 6000-lb capacity crane truck equipped with a magnet now spends part of its busy day loading skid boxes out in the scrap yard, the rest of the time loading the side dump bucket that feeds the cupola-charging skip. Some 200,000 lb of scrap are handled daily.



Here's How—After finishing its cupola charging, usually in the late afternoon, the vehicle moves outside to begin loading skip boxes for the next day's charge. Approximately 20 boxes make up a charge, and each box takes about 10,000 lb. Since this operation is the same, winter and summer, the user equipped the Elwell-Parker truck with an enclosed cab to provide the operator with all-weather protection.

As soon as the boxes are loaded, a platform truck moves them inside and positions them in a semi-circle around the spot from which the crane truck will operate. In this way, the crane has access to all boxes and the dump bucket without moving from the spot.

Charging Cycle—In the morning, the crane moves into position and the operator plugs the control cables for the dump bucket into the back of his cab. Now he can control both his own crane and the movement of the dump bucket from within the cab. At the same time, a battery charging unit located in back of the crane, is plugged in and the crane's batteries are charged during the in-plant operating hours.

The charge consists of various types of scrap, pig iron and sprue. Each portion of the load is weighed automatically after it is dropped into the dump bucket. When the dump bucket is full, the operator causes it to move forward on its track and discharge into the skip hoist. All motions are actuated by air cylinders.

The same operator also controls the dumping of the skip hoist when it is filled.

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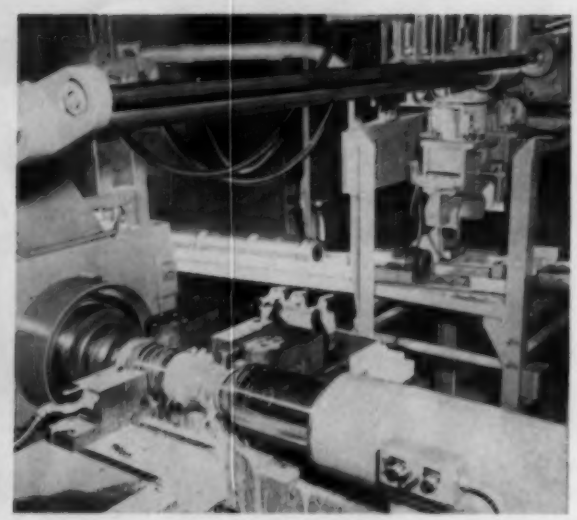
POWDERED METAL DIVISION

ST. MARYS, PA.



1. Front tool block turns the OD on the tool joint box forging. Rear blocks face both ends and make a groove. Load-unload clamps are at the rear

Machine Gets Automatic Loader

THE MACHINING of a tool joint box forging is shown. It becomes part of an oil drilling rig.

A semistandard machine was adapted to turn, groove and face automatically. Cycle time is about 3 minutes, 15 seconds. Forgings weigh 75 lb. The machine was made by Gisholt Machine Co., Madison, Wis.

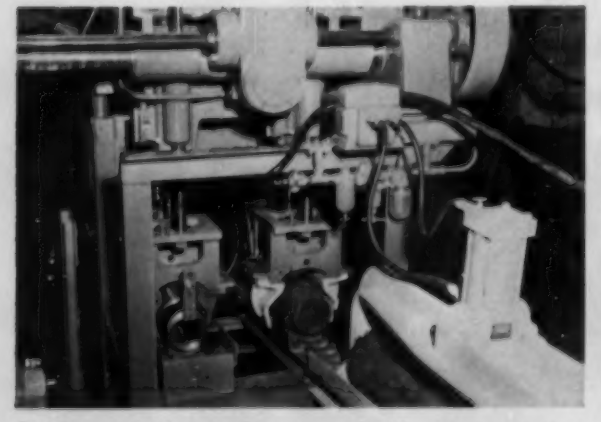
Delivery—Rough forgings come to the machine on a roller conveyor. A timing device delivers one each cycle to the load position on the conveyor.

A loading clamp, riding on a common carriage with an unloading clamp, picks up the rough forging, carries it over to the working position on the machine, and places it between two mandrels for cutting.

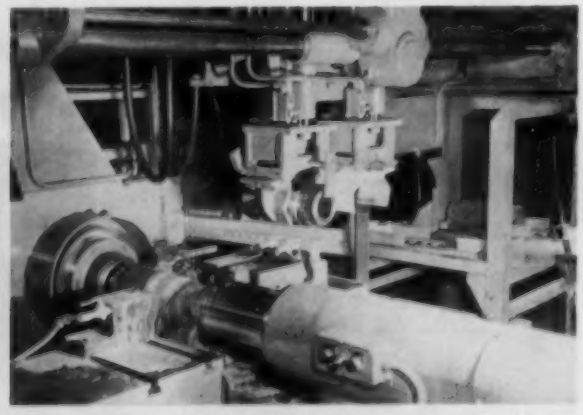
Exit — The unloading clamp takes the completed part from the mandrels, carries it to the rear of the machine and drops it on the unload conveyor.

The load-unload mechanism is air operated. An oscillating conveyor takes all chips away from the machine.

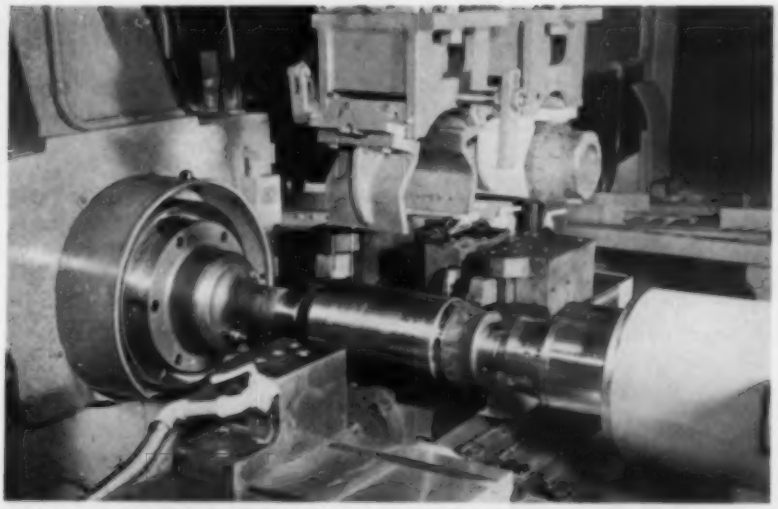
The machine is one of a series. Others are on the job for a Texas oil-tool builder. This machine is being held for exhibit at the Machine Tool Show.



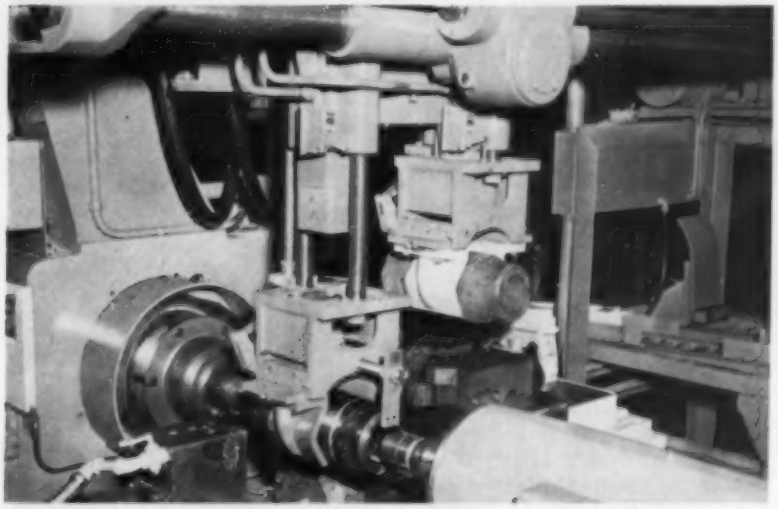
6. Clamps simultaneously put completed part on one conveyor, lift a rough forging off another. Timing device puts one rough forging at a time in pickup position



5. Chucking completed, the spindle starts and the machining cycle begins. Clamps move to the rear to put finished part on conveyor—pick up another rough forging

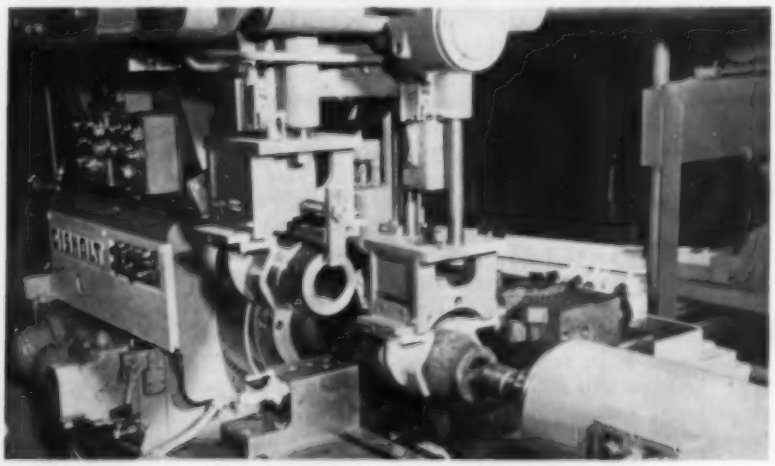


2. When machining is finished, spindle mandrel unchucks, tailstock retracts, pulling part into unload position. Clamps are in position over the part



3. Unload clamp drops to grab the machined part. The tailstock mandrel releases the part and retracts to clear for unloading. The loading claw stands by

4. The unload clamp lifts the finished part up and forward. At the same time the load clamp moves the rough piece into position for chucking



Automated Units

This transfer machine is an assembly of independent components. It eases changeovers.

PIECE-BY-PIECE automation promises to decrease the cost of obsolescence, permits part design flexibility and makes maintenance easier.

The concept is guiding the construction of a 111-ft long, 75-station inline transfer machine at Snyder Tool & Engineering Co., Detroit. Snyder engineers call it "segmented automation."

The machine will turn out 140 pump bodies an hour at 80 per cent efficiency. Parts are cast iron.

Individual—Machining is done by individual machines or segments. Each has its own base and slide units and control panel.

The only connection between segments is a transfer bar that raises parts from dowel locators at each station, moves them to the next station and locates them for the next operation.

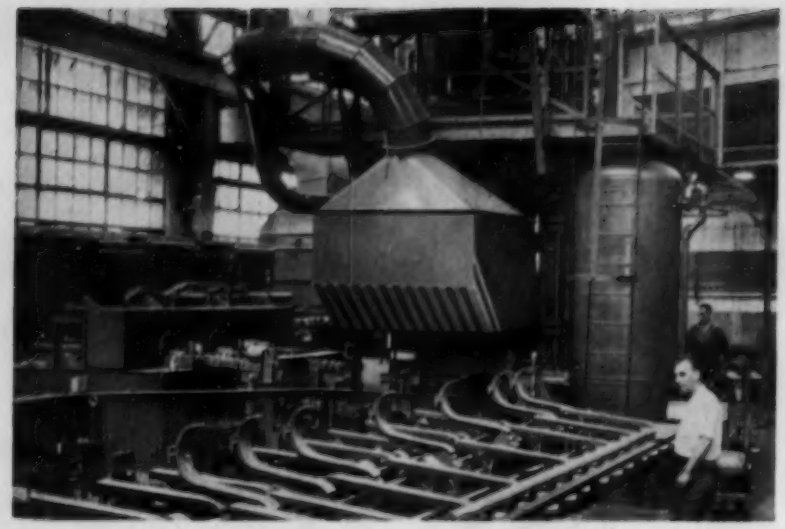
Changes—It is relatively simple to add or remove segments as part design changes. The transfer bar is disconnected, and bases, control panels and transfer bar sections are added or taken out of the setup. Necessary alterations are made in the master control panel that co-ordinates individual control panels.

Another advantage: Design and construction of machine portions can be under way before part design becomes final.

Grouped—The pump-body machine has 23 separate segments. They are divided into two groups, the first with 14 segments, the second with nine.

Either section can be loaded independently, operated and unloaded. Material can be stockpiled or finished regardless of the operating condition of the other section.

The segment between these two machine sections is a hydraulic index fixture. It turns the part over and rotates it before it enters the second machine section. It also can be used as the auxiliary loading station if the first section is shut down.



Teamed with an extrusion press at Scovill Manufacturing Co. . . .

Induction Heating Enters Brass Tube Picture

LOW FREQUENCY induction heating has moved into the brass alloy field. At Scovill Manufacturing Co.'s tube mill in Waterbury, Conn., a three-cell unit feeds a Schloemann vertical extrusion press which produces tube shells for cold drawing.

Magnethermic Corp. built the heaters, which operate on standard 60-cycle, 2300-v, 3-phase current. The cylindrical extrusion billets (7 in. in diameter and 11½-in. long) are nicely inside the limit (6 in. in diameter) at which low frequency heating becomes efficient.

Cycle—The 140-lb billets are fed by gravity conveyor to each of the three cells in rotation. Each cell brings its billet from room temperature to extrusion temperature in about 4 minutes (extrusion temperature varies with different alloys, but approximates a cherry red).

Billets are hydraulically ejected from the heaters and sent to the press on a 1½-minute cycle. The central heater ejects directly to a roller conveyor; billets from the flanking heaters are moved to the central conveyor by hydraulically actuated flippers.

Contrast—The old way was to heat the billets for 3½-hours in a large oil-fired furnace (10 x 40 ft). The induction unit by comparison is only 7 ft, 6 in. x 11 ft. If you include the electronic control cabinets, it still occupies only half the space of the old furnace.

There's no longer any need to bring in a man in the middle of the night to get the billets heated for the first shift. Start-up time is a matter of minutes.

Greater precision in quality control is another outstanding contribution. Each copper and brass alloy requires a different extrusion temperature, a controlling factor in the uniformity and quality of finished cold-drawn tubing.

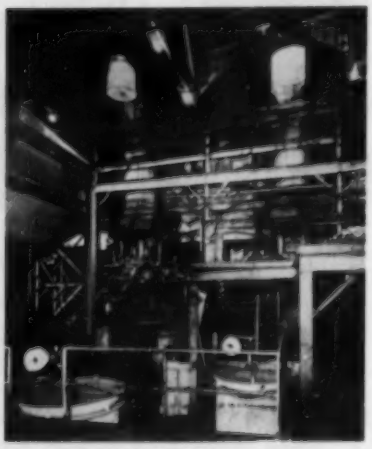
With the oil-fired furnace, operators were lucky to hold the temperature of billets entering the press within ±25°F. The induction heaters hold temperatures within ±15°F in regular production, and permit practically instantaneous change in heating temperature for different alloys.

Continuous Charging

Conveyor system enables foundry to pour 55 to 65 tons of malleable castings an hour

A MECHANIZED conveyor system insures constant, uniform charging during the 16 hours of pouring each day at the Cleveland Works of National Malleable & Steel Castings Co.

Heart of the system for each battery of two cupolas is a continuous, circular conveyor system in a pit, about 50 ft in back of the cupolas. Nine cone-bottom Whiting charging buckets travel on this conveyor and pass under the hoppers containing coke, limestone and metal. One bucket of coke and limestone and two buckets of metal are used for each 4-ton charge.

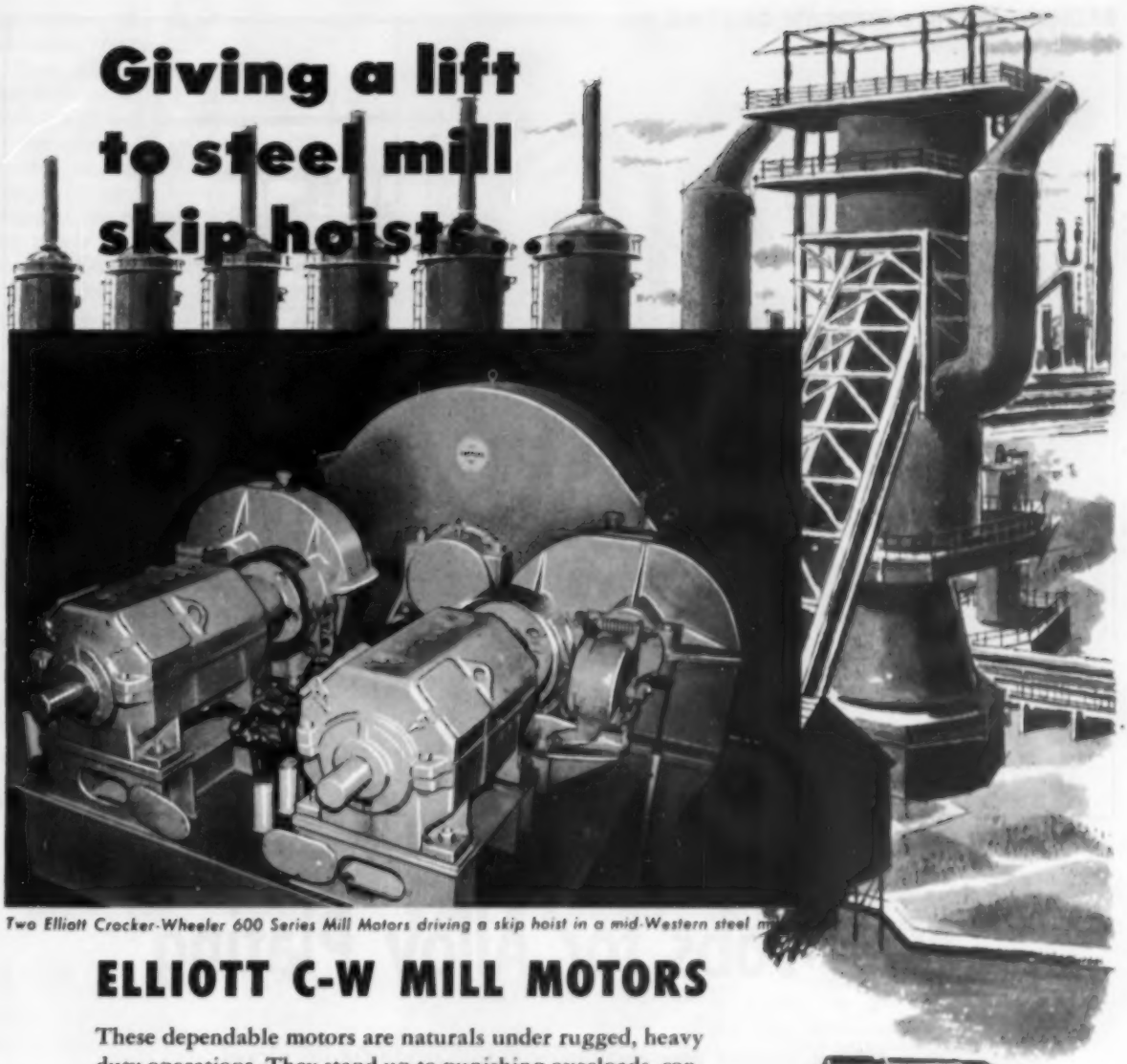


HOISTING CHARGING BUCKET
. . . circular conveyor is in foreground

Central Control—One operator controls all loading from his station in the center of the pit. Scales under hoppers are placed so that the operator and craneman can read them from their control stations. When a loaded bucket reaches one of the pickup points, the same operator controls the Whiting horseshoe charger that hoists the bucket, carries it into the wishbone support in the cupola, discharges the load and returns the bucket to its position on the conveyor. Each cupola is served by a 7½-ton horseshoe charger.

The foundry has four Whiting cupolas—two 120-in. units and two 108-in. units.

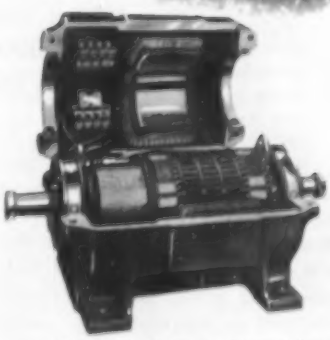
Giving a lift to steel mill skip hoists...



Two Elliott Crocker-Wheeler 600 Series Mill Motors driving a skip hoist in a mid-Western steel m

ELLIOTT C-W MILL MOTORS

These dependable motors are naturals under rugged, heavy duty operations. They stand up to punishing overloads, constant starting and stopping, reversing strains, etc., and come back for more every time. Their compact durability plus advanced engineering features assure greater power per standard frame size. The tough cast-steel frame is split for easy access to armature, bearings, and field coils. Standard 600 series motors can be readily adapted to separately forced-ventilated, protected self-ventilated or built-in back gear types. For details, ask your local Elliott field engineer, or write for the Mill Motor Bulletin. Address Elliott Company, Crocker-Wheeler Division, Jeannette, Pa.

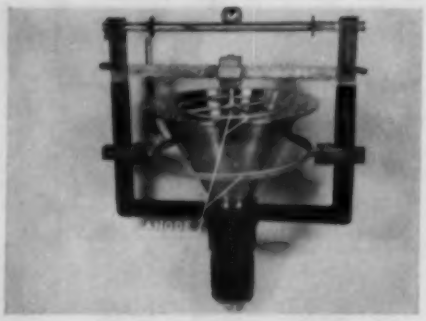


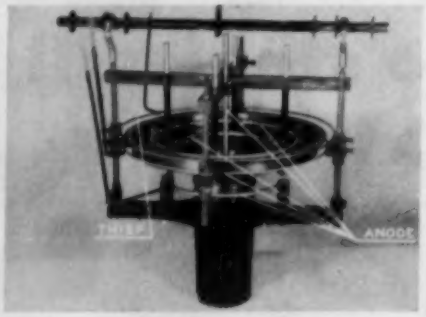
The split frame is hinged for easy access to all motor parts.

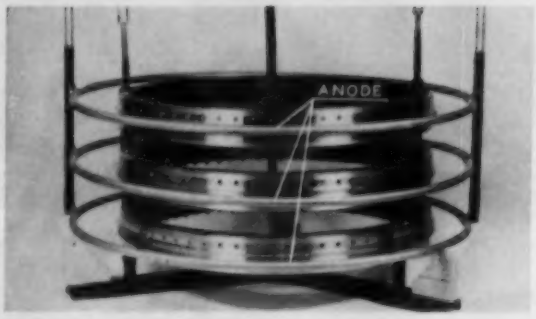
ELLIOTT Company

WS-9

RACKING TO GIVE UNIFORM COATING







New Jobs for Alloy Plating

A heat treated electroplate of 0.0002-0.0004-in. nickel, plus 0.0001-0.0002-in. cadmium, gives corrosion resistance to low alloy jet engine parts up to 1000°F.

PLATING with single metals sometimes won't do the job.

Pratt & Whitney Aircraft Co. has a case in point. Straight cadmium plate gives good corrosion protection on low-alloy steel parts used in jet engines, but above 550° F, stress-alloying results.

Dimensional requirements restrict the thickness of plate to 0.0005-in. maximum. Single plating with zinc, cadmium, tin, nickel and chromium and combination plating with nickel-zinc were tried. None gave adequate corrosion resistance and freedom from stress-alloying at elevated temperature.

Answer — Tests did show that 0.0003-in. nickel, plus 0.0001-in. cadmium, diffused at 630° F for 1 hour, would withstand 100 hours of salt spray without rusting—even if subjected to 23 hours at 700° F and 1 hour at 1000° F prior to exposure.

Details of the nickel-cadmium plating process were given by R. W. Moeller of Pratt & Whitney at the 42nd annual meeting of the American Electroplaters' Society in Cleveland.

Plating Solution—Deposits are produced from baths found in most plating departments. The nickel solution is of the chloride or chloride-sulphate (Watts) type containing no organic addition agents.

AMS specification 2416 allows use of other nickel solutions that give a low stress plate which will operate at high temperature without embrittling effects—the nickel sulphamate bath is being tried at Pratt & Whitney. Results are promising.

Second Coat—Cadmium is plated from a regular cyanide bath. To prevent a stained and fingerprinted

appearance, the plate is given a chromate treatment.

Next, all parts are heat treated for 1 hr at 630° F to diffuse the nickel and cadmium coatings.

The nickel plate must be deposited uniformly on the complex shapes of the jet engine parts. Because of the relatively poor throwing power of nickel plating baths, special fixtures (see illustrations top of page 90) are used to insure a uniform coating.

Proof—To pass the 100-hr salt spray test without corrosion of the diffused 0.0002-0.0004-in. nickel, plus 0.0001-0.0002-in. cadmium coating, distribution of the plate must insure at least 0.0002-in. nickel at the center as well as at the edges of the test panel.

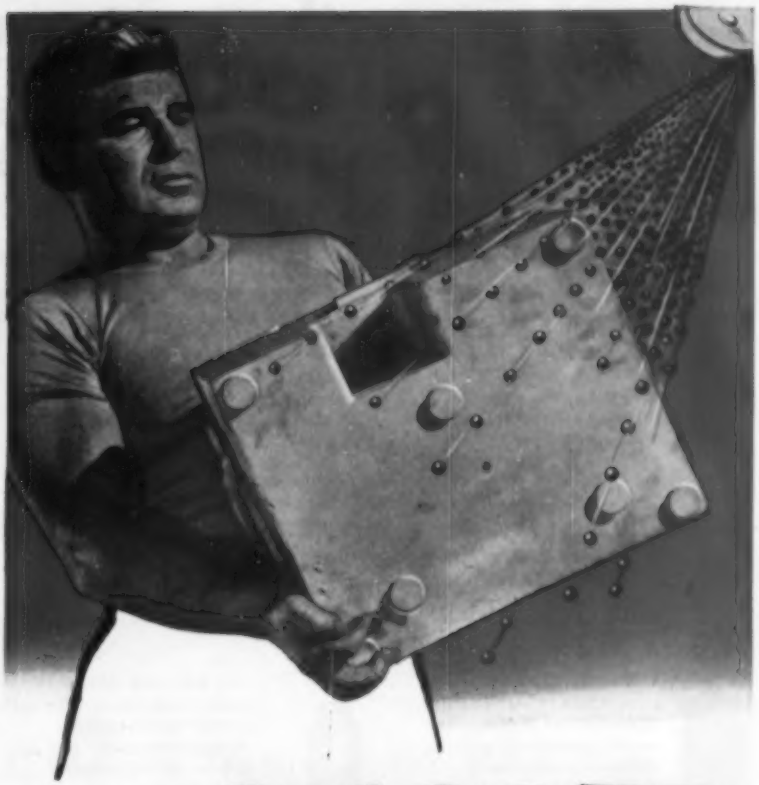
More Alloy—Straight alloy plating is doing another job at Pratt & Whitney. It's a lead-base alloy plated to contain 11 per cent tin and 7 per cent antimony for bearing use.

The ternary alloy is plated from a fluoborate bath (below) which was described in a paper by R. T. Putnam and E. J. Roser before the Electroplaters' Society.

Lead-Tin-Antimony Plating

Material	Alloy Composition
Tin	11.0%
Antimony	7.0%
Lead	Remainder

	Solution Composition (Nominal) g/l
Lead Fluoborate (as lead)	100
Tin Fluoborate (as Stannous Tin)	30
Antimony Fluoborate (as Antimony)	6
Free Fluoboric Acid	80
Boric Acid	25
Hydroquinone	0.5
Peptone (Lactalbumin Peptone)	15
Temperature	70°F
Current Density	0.28 amp./sq. in.
Agitation	Mild



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To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

U. S. Patent #2184926 (Other patents pending)

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Model S3406-6S—⅜" pipe size.
200 bearing inch capacity.
Model S3406-8S—1" pipe size.
300 bearing inch capacity.

½ PT. OIL CAPACITY
Model 30-41-2S—¼" pipe size.
32 bearing inch capacity.

1¾ GAL. OIL CAPACITY
Model X3400-2S—¼" pipe size.
32 bearing inch capacity.
Model X3400-6S—⅜" pipe size.
200 bearing inch capacity.
Model X3400-8S—1" pipe size.
300 bearing inch capacity.

4½ GAL. OIL CAPACITY
Model Y3400-2S—¼" pipe size.
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Model Y3400-6S—⅜" pipe size.
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Replaceable, metal oil reservoir.
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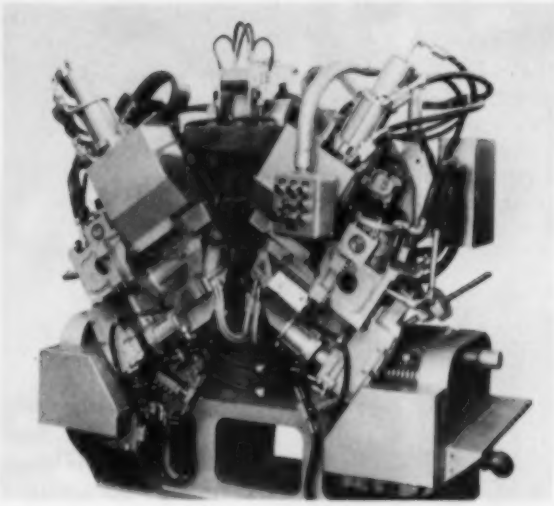
Resistance Welder Joins Strip Steel To Forgings



This double end welder, a new development, cuts production time and costs by simultaneously joining both ends of a strip of steel to a forging. Product: Automatic transmission bands for automobiles.

Flash-butt welding of rolled steel band stock to high-strength forgings produces low cost bands of lasting strength. Welding both ends at once cuts production costs even more. Designed for the lightest possible weight, bands must withstand the severe service of repeated loading.

Welds are of the same cross section as the band, since resistance flash-butt welding gives a 100 per cent efficient joint. No special preparation of the forging is needed to make the welded joint.

After welding, the joints are broached free of flash; the forging is severed and machined.

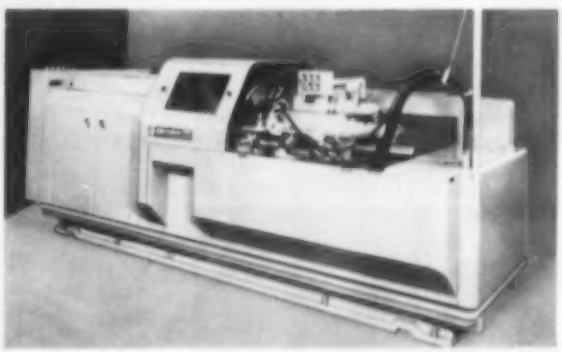
The welder is adjustable for many band sizes and forging shapes. *Write:* Taylor-Winfield Corp., Warren, O. *Phone:* 2252-1

Automatic Tracing Lathe Hogs ½-in. Cuts

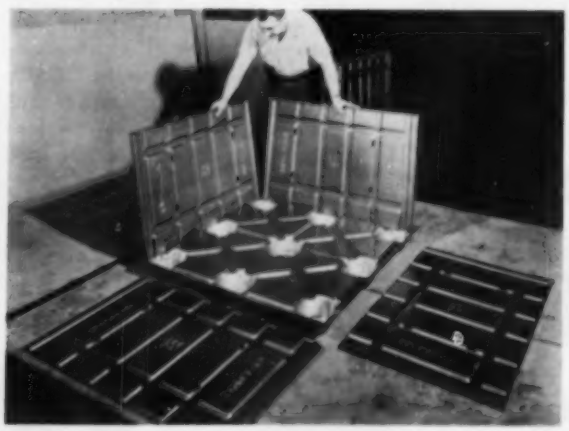
This new, sequentially controlled machine takes up to four automatically controlled tracing cuts. A two-position automatic indexing tool holder on the tracing slide of the carriage permits heavy roughing with one tool, accurate finishing cuts with another.

A 12 in. backarm can be set to rock in any time during the carriage cycle for cutting grooves and rough or finish facing.

Feed and speed changes are automatic during a cut for optimum cutting speeds on changing diameters or angles. *Write:* Jones & Lamson Machine Co., 40 Woolson St., Springfield, Vt.



Lightweight Shipping Container Is Easily Set Up



This compact combination of steel pallet, container sides and top, is fully nestable in its component parts. The cover insures cleanliness and protection of contents during shipment or extended storage.

Tierable, it is a pallet and shipping box combination that can be used for inter or intraplant use.

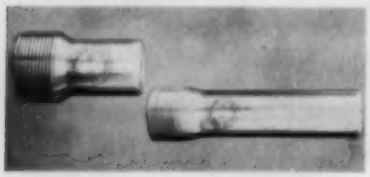
The unit is manufactured in three standard sizes, which weigh 85, 99.5 and 122 lb each. Parts of a given size are interchangeable. When not in use, the unit can be knocked down and nested for storage.

The unit supports static loads of over 10,000 lb; the bottom alone, over 60,000 lb. *Write:* Ackerman Mfg. Co., Wheeling, W. Va. *Phone:* Warwood—175

NEW PRODUCTS and equipment

Sandblast Nozzles

Venturi nozzles give higher square foot blasting per hour. They will fit all sandblast units in use.



The design produces higher impact and a larger pattern. Uniform impact, without the large fringe area, permits the blaster to clean a surface faster and cleaner.

Orifices are from $\frac{1}{16}$ to $\frac{3}{4}$-in. A tungsten carbide lining insures long life. *Write*: Clementina Ltd., 2277 Jerrold Ave., San Francisco 24, Calif. *Phone*: Atwater 2-1429

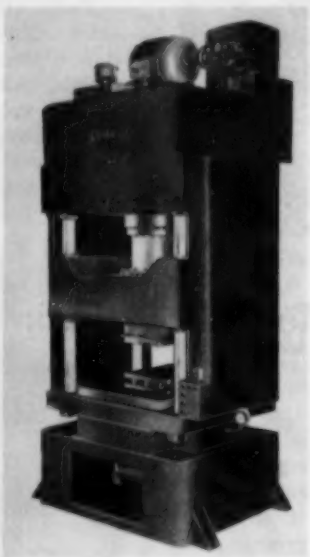
Portable Pyrometer

Surface temperature measurements are accurate within 0.5 per cent in the 100 to 2400° F range. The pyrometer may be used for oxidized steel or cast iron, many oxidized nonferrous metals and painted surfaces even though surrounded by cooler air.

The measuring head of the instrument is mounted on a telescopic arm which can be extended to 9 ft. It is connected by a trailing lead to a portable millivolt meter that is calibrated in degrees. The unit requires no external power supply. *Write*: Fielden Instrument Division, Robertshaw-Fulton Controls Co., 2920 N. Fourth St., Philadelphia 33, Pa. *Phone*: Garfield 6-6750

Single Action Press

This 300-ton hydraulic press is electronically controlled for automatic or semiautomatic operation. The slide return is controlled by either pressure or length of stroke setting. The slide return may be inched up or down or the press



may be manually operated when the slide is in the up position. The pump by-passes at zero pressure. *Write*: Clifton Hydraulic Press Co., 288 Allwood Rd., Clifton, N. J. *Phone*: Prescott 8-3474

Plastic Coated Wire Rope

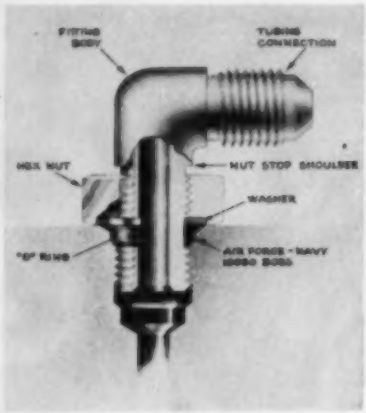
Preformed galvanized steel or stainless steel wire rope is coated with strong, tough, flexible plastic. Coating thickness varies with diameter.

Wire sizes range from $\frac{1}{16}$ to $\frac{1}{4}$-in.; coating thicknesses are $\frac{1}{8}$ to $\frac{3}{8}$-in. Strengths are from 480 to 7000 lb.

Flexibility of the rope is not affected by the coating. It resists most acids, bases, salts, oils and greases—exceptions: Hydrofluoric acid and methyl ethyl ketone. *Write*: Macwhyte Co., Kenosha, Wis. *Phone*: Olympic 7-7121

Tube Fittings

Perfect sealing even in repeated use is the feature of a new tube fitting design that utilizes an O-ring and boss combination to obtain a leak proof seal.



Fitting bodies: Straight, 45 or 90 degree elbows and male outlet and male run tees. They are available to fit $\frac{1}{4}$-to-1-in. tubing. *Write*: Monarch Machine Tool Co., Sidney, O. *Phone*: 2-1381

Conveyor Frames

Prepunched conveyor frames make it possible to reposition rollers to meet changes in product or container shapes.

Tearing down the setup is eliminated because roller spacing can be changed quickly with quick-acting spring lock axles. Units are available in all roller sizes and 11 different frame sizes. *Write*: Sage Equipment Co., Inc., 30 Essex St., Buffalo 13, N. Y. *Phone*: Elmwood 5242

Primer for Magnesium

A new primer can be sprayed or dipped and is fast drying. Designed to check electrolytic decomposition in assemblies where magnesium is joined to a less active metal, the

360° hoist hook service . . .

WITH - AMERICAN MONORAIL PEDESTAL JIB

Here's the answer to economical local handling service to process machines, particularly beneath heavy mill type cranes . . . it's the American MonoRail Pedestal Jib. These jibs are recommended for capacities between 500 to 4,000 pounds, headroom 9 and 12 feet, and boom length 8 and 12 feet . . . a truly precision built, skillfully engineered job. Turn to American MonoRail for any overhead handling requirements. Your American MonoRail engineers will be glad to consult with you.

Write for Bulletin PJ-1

For Continuous Flow of Light Loads Use Landahl Chainless Conveyors

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13102 ATHENS AVENUE • CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

primer also resists the solvent action of hydraulic fluids in aircraft.

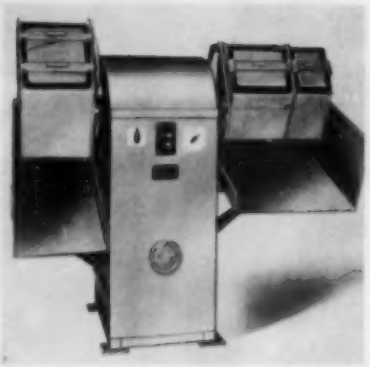
The primer can be applied directly to either untreated or chemically treated magnesium. A film thickness of 1½ mils provides salt spray resistance. *Write:* Stanley Chemical Co., subsidiary of Stanley Works, New Britain, Conn. *Phone:* Baldwin 9-2021

Barrel Finisher

Three different barrels (capacities, 5 gal and 1.1 and 2 cu ft) are fitted to this finisher. With the smaller barrels on one side of the unit, loads on either end of the shaft are balanced.

Antifriction ball bearings are used throughout; a variable speed drive gives speeds from 12 to 36 rpm. Barrels can be furnished with a vinyl plastic lining.

Movable chutes tilt forward and backward to help drain liquids and materials separately. *Write:* Rampe Mfg. Co., 14915 Woodworth Ave., Cleveland 10, O. *Phone:* Express 1-8455



Cowles Ty-Bond

the first new zinc phosphate coatings in twenty years!

Cowles TY-BONDS . . . amorphous and non-sludging . . . are *not* revisions of old-type coatings. They are completely new coatings—completely new formulations.

Cowles TY-BONDS form tight, hard, clean coatings . . . even the most severe bending, flexing or twisting cannot remove TY-BONDS. They cover the metal completely, no pin-points of metal are left unprotected. Old-type coatings leave as much as 60% exposed to corrosion!

Cowles TY-BONDS are economical because they are non-sludging. There is remarkably little waste . . . more than 90% goes into the surface treatment. TY-BONDS save time by reducing coating cycles and tank clean-outs, and meet all government specifications.

Your Cowles Technical Representative will be happy to give you complete information on the uses and applications of Cowles TY-BOND zinc phosphate coatings. Write or call today.

Cowles CHEMICAL COMPANY

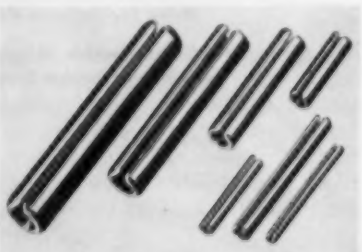
7016 Euclid Ave. • Cleveland 3, Ohio

Variable Speed Motor

All gears and mechanical means of power transmission are eliminated. The alternating current motor is capable of running at variable speeds and ranges. It can provide from ½ to 1000 hp, with speeds ranging from 30:1 to 1.5:1. It operates on 3-phase power of 50, 60 or 400 cycles. The motor is adapted to high-starting torque loads. *Write:* Bogue Electric Mfg. Co., 52 Iowa Ave., Paterson, N. J. *Phone:* Lambert 5-2200

Beryllium Copper Pins

Slotted chamfered tubular spring pins, heat treated for maximum strength, are from 0.062 to 0.250 in. in diameter and come in a wide range of lengths. Among their applications: They are used with other copper base alloy components where galvanic action is an important design consideration. The pins are nonmagnetic, have good electrical conductivity and a high resistance to corrosion. *Write:* Elastic Stop Nut Corp. of America, Union, N. J. *Phone:* Murdock 6-6000



NEW Literature

Write directly to the company for a copy

Brass Rod Weight Table

This table estimates the weight of free-cutting brass rod required for screw machine products fabrication —4 pages. Scovill Mfg. Co., Waterbury 20, Conn.

Stainless Steel Welds

Stress rupture properties of chromium-nickel stainless steel weld deposits are given—technical data card 178. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Stainless Steel

Here is a detailed materials selection chart that covers more than 300 corrosive solutions; engineering data section includes design and dimensional information on stainless steel pipe and its joining—catalog 55, 16 pages. Public Relations Division, Cooper Alloy Corp. Hillside 5, N. J.

Lift Truck Rating Table

This truck selection guide and rating table helps the comparison of job requirements with truck features—form 1411, 4 pages. Hyster Co., 2902 N.E. Clackamas, Portland 8, Oreg.

Super-Spacers

Operating instructions and specifications on 8 and 12 in. super-spacers and their accessories are detailed—bulletin S-104, 20 pages. Machine Tool Accessory Division, Hartford Special Machinery Co., Hartford 12, Conn.

Adhesive Bonding

Selection of the correct formulation and process for adhesive bonding is illustrated—8 pages. Rubber & Asbestos Corp., Dept. P, 225 Belleville Ave., Bloomfield, N. J.

Industrial Trucks

Here are 24 cost-cutting ideas for fork trucks, platform trucks, cranes and other models. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.

Dust Collector

Air scrubbing with water for dust collection is described—bulletin 55, 10 pages. National Dust Collector Corp., Machinery Hall Bldg., Chicago 6, Ill.

Infrared Heat

Examples of infrared uses in baking, drying, preheating and degreasing are illustrated—20 pages. Fostoria Pressed Steel Corp., Fostoria, O.

Pool Washing Screen

Diagrams explain how the pool washing screen gives efficient wet screening and effective recovery of materials such as limestone, lead, zinc, iron ore and tungsten—bulletin 07B8214, 8 pages. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Drills

Installation, operation and maintenance of bench, floor and multispindle drills are covered—catalog D-135, 24 pages. Cincinnati Lathe & Tool Co., Cincinnati 9, O.

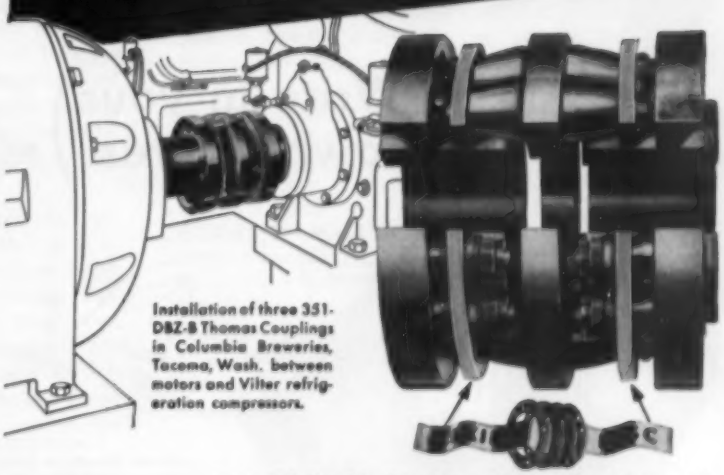
Roller Bearings

Featured are ball bearing pillow blocks, flange cartridge mounts and other power transmission machinery. Engineering drawings, dimensions, shaft sizes, weights and radial load ratings are given—bulletin A-638, 52 pages. Dodge Mfg. Corp., Mishawaka, Ind.

Weldment Cleaning

Abrasive blast cleaning of rust, flux and spatter from welded pieces is covered—bulletin PE-6. American Wheelabrator & Equipment Corp., 1157 S. Byrkit St., Mishawaka, Ind.

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



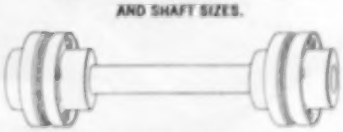
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.



Write for our new Engineering Catalog No. 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

You start to save money with the first American Phillips Screw driven in your assembly departments. And your savings multiply from then on. No waste motion, less fatigue. No screws dropped or lost. No backing out and re-driving . . . because American Phillips Screws *drive straight automatically*. No broken screwheads. No gouged work-surfaces . . . because the 4-winged driver can't slip out to rip and scar. Now add up all these savings, and you come out as much as 50% ahead of old-fashioned fastening methods.

Next — add up all the advantages of buying *American* . . . still the first-choice source for Phillips Screws. American's capacity, unmatched experience, and *engineering pioneering* mean that you have a top supplier that you can always bank on to keep your production rolling. Yes, you lift a load off your mind when you buy American. Let's talk it over . . . *any time you say.*

✕ *marks the spot . . . the mark of extra quality*

AMERICAN SCREW CO.

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan

STEEL

August 1, 1955

Market Outlook

STEEL production appears headed for a new record. All that's necessary is for the furnaces to average 90 per cent capacity in the closing six months. They operated at 91.6 per cent and produced 57,194,835 net tons in the first half. If they do no better than 90 per cent in last half, 1955 output will come pretty close to 114 million net tons, topping the 1953 record of 111,609,719 tons by more than 2 million.

ON ITS WAY—Right now it certainly looks like the industry is on its way to an outstanding performance. Except for to-be-expected maintenance problems, there is nothing in sight to even hint a serious check on production in the months ahead. Since the strike-induced suspensions at end of June, the ingot rate has scored an impressive recovery. It has climbed 22 percentage points the past month. Still the furnaces haven't made up all ground lost because of the strike. Last week, ingot operations stood at 93 per cent, off ½-point from the preceding week and 2 points under the prestrike rate. Last week's decline was due largely to equipment repairs.

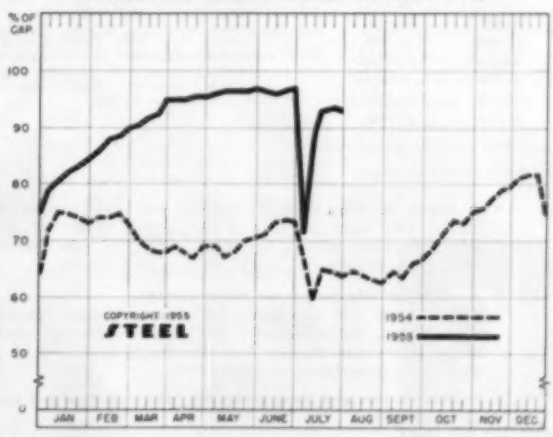
SEASONAL SURPRISE—What makes the production showing particularly comforting is that July operations ordinarily are hampered by vacations and hot weather. The seasonal factors were present, but, surprisingly, they were offset by relentless demand pressure. New business has continued to come out despite higher prices, while anticipated order cutbacks from the automotive industry and other consumers haven't materialized.

MILLS OVERSOLD—Producers are oversold on about every product. Carry-over into the fourth quarter may necessitate blanking out up to six weeks of production. Certain sheetmakers are cutting back fourth quarter allotments as much as 35 per cent. Some flat-rolled producers are out of the market for the remainder of the year, not only on hot and cold-rolled grades but on galvanized and electrical sheets as well as other specialties. Rails appear to be the only major product not under extreme pressure. With railroad car needs mounting and larger ship requirements in the offing, fourth quarter steel supply promises to be the most stringent since early 1953.

INVENTORIES LOW—Failure of a third quarter slump to materialize has producers guessing to some extent. Consumers evidently didn't replenish stocks materially in recent months. Still, since summer ordinarily is a period of stock accumulation, inventories are bound to get increasing attention as weeks pass. As in 1953, stocks in the hands of consumers could be the key to the market situation in the months ahead.

PRICES FIRM—Except for a downward revision on cooperage hoops from $5.325 per 100 lb to $4.75, representing a net increase of $5.50 per ton over the price in effect before the recent general steel increase, prices are firm. Foundry coke, however, is up $1.25 a ton at several points, and the increase is expected to become general. Scrap also continues to rise, the composite on steelmaking grades being up $1.83 to $42. The finished steel composite is steady at $126.64.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended July 31	Change	Same Week 1954	Same Week 1953
Pittsburgh	90.5	+ 2.5*	60	95.5
Chicago	98	— 0.5*	66.5	90
Mid-Atlantic	94	— 1	57	97.5
Youngstown	98	0	64	105
Wheeling	92.5	0	76	99
Cleveland	88	—10*	65	102
Buffalo	105	0	56	108.5
Birmingham	93.5	0	75	100
New England	83	— 1	55	89
Cincinnati	86	+ 3	55	90.5
St. Louis	97.5	+ 9.5	47.5	93
Detroit	89.5	+ 2	54.5	102
Western	101	+ 2	82	107.5
National Rate	93	— 0.5	64	96.5

INGOT PRODUCTION‡

	Week Ended July 31	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	142.2†	136.6	108.8	95.4
NET TONS (In thousands)	2,284†	2,195	1,716	1,532

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 29 Technical Outlook—p. 71

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	July 26 1955	July 19 1955	Month Ago	June Average
(1947-1949=100)	153.9	153.9	144.9	144.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.600	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.998
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.550
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.388
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	156.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.130
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.062
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.583
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.233
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.338
Bars, C.F., Carbon	6.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless, 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale Ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.615
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.547
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	July 27 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	207.63†	207.63	194.53	195.87	156.69
Index in cents per lb	5.625†	5.625	5.270	5.306	4.245

†Revised

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$126.64	$126.64	$118.45	$117.43	$94.36
No. 2 Fdry, Pig Iron, GT	58.99	58.99	56.54	56.54	46.85
Basic Pig Iron, GT	58.49	58.49	56.04	56.04	45.97
Malleable Pig Iron, GT	59.77	59.77	57.27	57.27	47.49
Steelmaking Scrap, GT	42.00	40.17	35.00	27.33	37.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 27 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.85	4.65	4.30	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.30	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.56	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.40	5.40	4.10-4.15
Shapes, Std., Pittsburgh	4.60	4.60	4.25	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.25	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.53	4.53	3.42
Plates, Pittsburgh	4.50	4.50	4.225	4.225	3.50
Plates, Chicago	4.50	4.50	4.225	4.225	3.50
Plates, Coatesville, Pa.	4.50	4.50	4.225	4.225	3.60
Plates, Sparrows Point, Md.	4.50	4.50	4.225	4.225	3.50
Plates, Claymont, Del.	4.50	4.50	4.225	4.225	3.60
Sheets, H.R., Pittsburgh	4.325	4.325	4.06	4.06	3.35
Sheets, H.R., Chicago	4.325	4.325	4.06	4.06	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	4.95	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	4.95	4.95	4.10
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.10	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.45	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.06	4.425	3.25-3.50
Strip, H.R., Chicago	4.325	4.325	4.06	4.06	3.25
Strip, C.R., Pittsburgh	6.317	6.317	5.75	5.75	4.15-4.50
Strip, C.R., Chicago	6.35-6.45	6.45-6.55	5.85	6.00	4.30
Strip, C.R., Detroit	6.35	6.35-6.55	5.85	5.60-5.90	4.35-4.95
Wire, Basic, Pittsburgh	6.25	6.25	5.75	5.75	4.50
Nails, Wire, Pittsburgh	7.60	7.60	6.85	6.85	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50

SEMIFINISHED STEEL

Billets, Forging, Pitts. (NT)	$84.50	$84.50	$78.00	$78.00	$63.00
Wire Rods, ⅜-⅝" Pitts.	5.023	5.023	4.673	4.525	3.85

PIG IRON, Gross Ton

Bessemer, Pitts.	$59.50	$59.50	$57.00	$57.00	$48.50
Basic, Valley	58.50	58.50	56.00	56.00	46.00
Basic, deld. Phila.	56.16	56.16	53.66	53.66	49.44
No. 2 Fdry, Pitts.	59.00	59.00	56.50	56.50	46.50
No. 2 Fdry, Chicago	59.00	59.00	56.50	56.50	46.50
No. 2 Fdry, Valley	59.00	59.00	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	59.66	59.66	55.16	60.16	49.94
No. 2 Fdry, Birm.	55.00	55.00	52.88	53.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	60.58	60.43	49.08
Malleable, Valley	59.00	59.00	56.50	56.50	46.50
Malleable, Chicago	59.00	59.00	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$42.00	$39.50	$35.50	$28.50	$41.00
No. 1 Heavy Melt, E. Pa.	43.00	42.00	39.00	24.50	33.00
No. 1 Heavy Melt, Chicago	41.00	39.00	35.00	29.00	38.00
No. 1 Heavy Melt, Valley	41.50	40.50	37.50	26.50	40.75
No. 1 Heavy Melt, Cleve.	39.50	38.50	35.00	24.50	38.50
No. 1 Heavy Melt, Buffalo	34.50	34.50	29.50	26.50	36.75
Rails, Rerolling, Chicago	50.00	50.00	52.50	43.50	45.50
No. 1 Cast, Chicago	45.50	45.50	42.50	35.50	44.50

COKE, Net Ton

Beehive, Furn, Connisvl.	$13.75	$13.75	$13.75	$14.75	$14.25
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	16.75	15.50
Oven, Fdry, Chcago	24.50	24.50	24.50	24.50	21.00

Daily Nonferrous Price Record

	Price July 27	Last Change	Previous Price	June Avg.	May Avg.	July 1954 Avg.
Copper	36.00	Mar. 29, 1955	33.00	36.000	36.000	30.000
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.800
Zinc	12.50	June 16, 1955	12.00	12.250	12.000	11.000
Tin	98.25	July 27, 1955	98.625	93.665	91.410	96.558
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	23.200	23.200	21.500
Magnesium	28.50	Mar. 21, 1955	27.00	25.500	28.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99+%, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

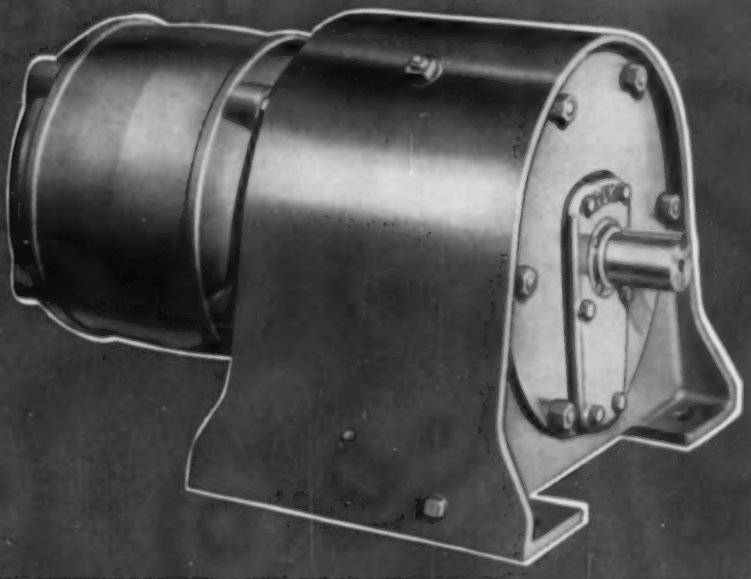
- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

Announcing the *–Newly Designed–* Integral

ALL-STEEL FALK Motoreducer

(Gearmotor Type–Supplementing Falk All-Motor Line)

. . . with completely standard round-frame, D-flange motor



Check and Compare these features...

Meet a faithful old friend in a new, modern dress! The famous, time-proved Integral Type *all-steel* Falk Motoreducer (Supplementing Falk All-Motor Line) has been redesigned into a compact, streamlined unit providing the utmost in space economy—but retaining all the application versatility, long-life performance, easy-maintenance features and superior structural qualities that have made Falk Motoreducers the recognized standard throughout industry.

In this new Integral unit—rated in accordance with AGMA standards—a *completely standard* round-frame, D flange NEMA motor is mounted directly on the all-steel Motoreducer housing. The motor remains a separate piece of equipment, readily replaceable with any other type or make. Output speed (ratio) can be changed within unit's torque capacity without modifying motor. Size and arrangement of the standard housing permit wide ratio range—from 3.36:1 to 542:1.

In order to meet the greatest number of industrial application needs, the newly designed Integral Motoreducers are available in horizontal and vertical models, both in concentric and right-angle types; double, triple and quadruple reduction; horsepower range, 1 to 40 HP. Prompt stock shipment in standard ratios is offered.

Whatever your reduction requirements, you get greatest dollar-for-dollar value in the long run by standardizing on Falk products. Write for Bulletin 3104.

Every FALK Motoreducer has these "In-built" Factors—

Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

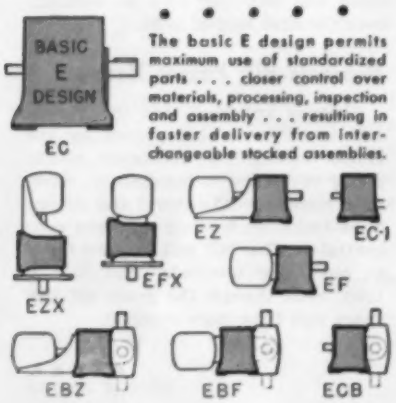
All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

Sealed Housings. Dual closures and one-way vents keep oil *in*, dust and moisture *out*. Units are splash-proof, leakproof, dustproof.



The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.

FALK

. . . a good name in industry

THE FALK CORPORATION · 3001 W. Canal St. · Milwaukee 8, Wis.

WRITE FOR BULLETIN 3104

Nonferrous Metals

Government restricts exports of copper scrap and refined copper of foreign origin. But the total supply advantage for domestic consumers won't ease the pinch

Nonferrous Metal Prices, Pages 104 & 105

THE COPPER SHORTAGE is becoming increasingly difficult to live with, and nobody knows that better than the government. In an attempt to relieve the situation a little, the Commerce department last week cut third-quarter export quotas of copper scrap by 45 per cent, compared with what they were the second quarter.

The percentage is about what was expected in view of the stand taken by the State department. U. S. exports, especially to Germany, have been a vital part of the nation's efforts to get Europe back on her feet. The State department didn't want to disrupt that program. But the needs of our own economy were strong enough to call for some cutback, even though it was not so much as domestic users desired.

Not Much—What does it all amount to? In terms of tonnage, it's just a drop in the bucket, but right now even that is mighty important. Total tonnage of the second-quarter scrap quota was 16,000 tons—5000 tons for unalloyed, 10,000 for alloyed and 1000 for alloyed ingots. The new figures are 2750 tons for unalloyed copper scrap, 5500 for alloyed and 550 for alloy ingots. The net advantage to domestic users for all scrap in the third quarter is 7200 tons—not much when you consider that by last week the industry had lost well over 50,000 tons of basic production because of the copper strike.

At the same time, the Commerce department announced it has set a quota of 54,000 tons on exports of refined copper of foreign origin in the third quarter. This represents no gain in supply, but it does assure the industry that such exports will not rise above the 1954 rate.

No Break—Last week left plenty of room for improvement in the negotiations going on between the union and western producers. In fact, the situation was so bad it seems that further developments could only be for the better. After Anaconda Co. settled, it was a good bet the union would come to terms with Kennecott, Phelps Dodge and American Smelting & Refining. But despite efforts of producers to follow the Anaconda and steel settlements, the union took a negative position, which continues to baffle most observers. What is to be gained by either party by further prolonging the strike is a question nobody can answer.

In an attempt to ease the tension, A. D. Ross Fraser, president of Rome Cable Corp. and chairman of the wire and cable section of the National Electrical Manufacturers Association, sent a telegram to President Eisenhower asking him to invoke the 60-day cooling-off period provided for in the Taft-Hartley Act. If this happens, workers will return to the mines and smelters for at least two months.

New High in London—In the meantime, the London market advanced to the highest point of the year last week when it stood at better than 46 cents a pound. The last time it reached the 46-cent level was on Mar. 22. The domestic shortage, plus this high foreign price, has created record-high prices in the open market here, too, for copper and scrap.

ODM Studies Nickel Allocations

Even though there are no strikes in the nickel and aluminum industries, metal is nearly as hard to get there, too. Nickel continues to be the mystery metal as defense requirements outdistance stated requirements drawn from bills of materials. The Business & Defense Services Administration has asked Defense Mobilizer Arthur S. Flemming to release an additional 1 million lb of nickel from stockpile-destined shipments, bringing the total third-quarter release up to 5 million lb. But Mr. Flemming has said he has no intention of making deferments indefinitely. He also wants to know why defense shipments are exceeding estimated needs before granting too much relief to civilian users. Some industry spokesmen have contended right along that those estimates were low, and now say that there is nothing fishy in the beefed-up orders.

If the Office of Defense Mobilization decides that the demands of national defense have been the cause of the shortage, then the provisions of the Defense Production Act permitting allocations may be put into effect. Allocation controls have been under consideration for about two months (STEEL, June 6, p. 47).

Setasides Have Little Effect

The new setasides announced for the fourth quarter will have little, if any, effect on civilian consumption of aluminum, copper and steel. ODM allocated 121 million lb of aluminum, which is greater than the third-quarter figure, but not enough to disturb the civilian supply, tight as it is. The new setaside represents about 16 per cent of total supply, only 1 per cent more than in the present quarter. One aluminum official said: "The difference is insignificant. We have learned to live with the setasides and are used to minor fluctuations in the amount. We could use that extra metal, but with production increasing we won't be any worse off in fourth quarter than we are now."

Copper received a cut for fourth quarter, down to 53 million lb, which may help the civilian supply somewhat. But, at present, it is an academic question of how much. Steel allocation for defense users also was down from the third quarter, having been set at 675,000 tons.

Profits, Earnings Look Good

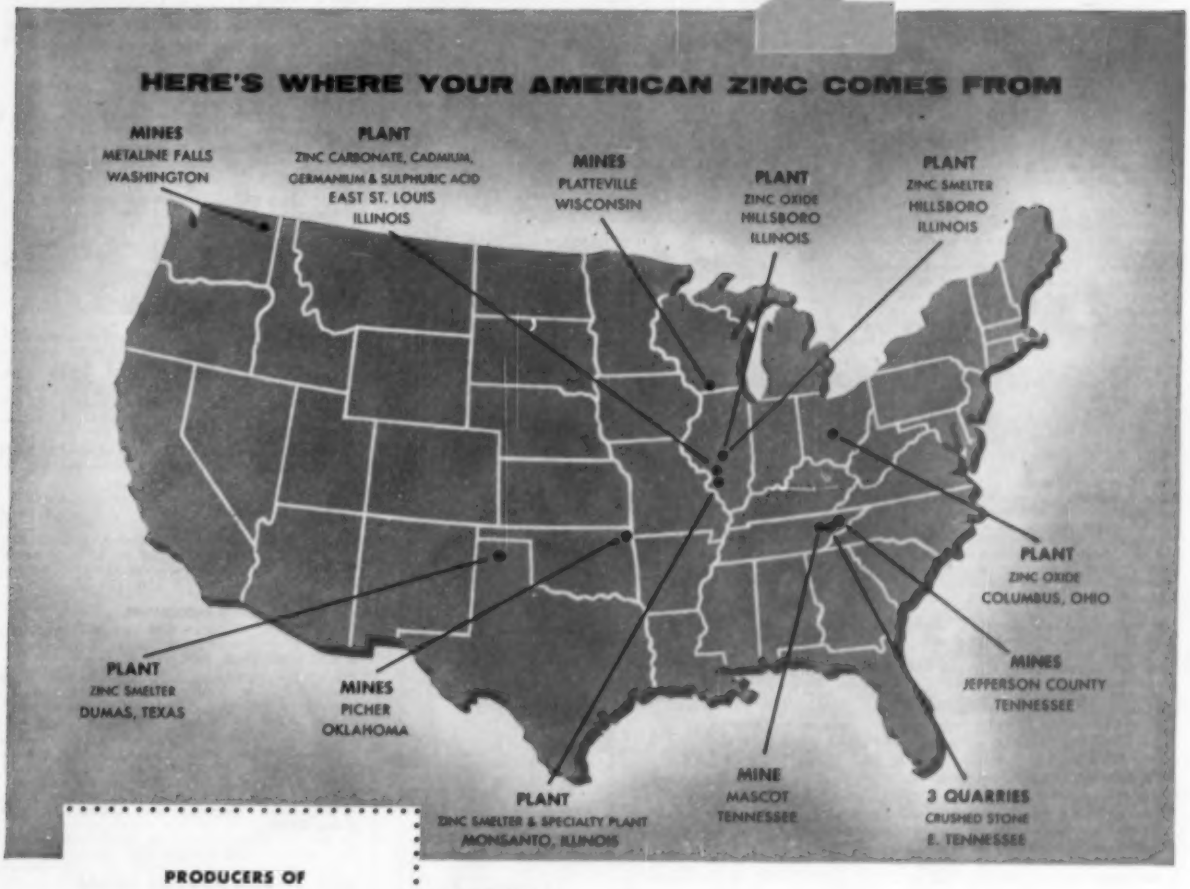
Midyear financial reports from nonferrous companies are beginning to show up, and they confirm the feeling of prosperity that pervaded the industry until the copper strike came along. Both sales and earnings were up in most cases. National Lead Co. reports 34 per cent greater earnings on 23 per cent greater sales during the first six months of 1955, compared with the same period last year. St. Joseph Lead Co. reports earnings of $6,741,906, compared with $2,749,192; and sales of $62,427,726, compared with $39,927,130. Climax Molybdenum Co. had record sales and earnings in both the second quarter and first half. Bridgeport Brass Co. had higher sales for the first half but lower profit. The latter was accounted for by the heavy cost of starting the company's aluminum division at Adrian, Mich. Not until June did that division break into the black. Revere Copper & Brass Corp. shows an increase of 27.5 per cent in sales and 26.6 per cent in earnings over the first half of 1954.

Minerals Bill Passes House

Chances are good that the Senate will approve the bill passed by the House calling for continued stockpiling of tungsten, manganese, chromite, mica, asbestos, beryl and columbium-tantalum bearing ores and concentrates. The bill will require ODM to buy these minerals until July 1, 1958, even though the goals set two years ago have been reached.

American inc and its products

from A *to* Z



PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
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SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
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AGRICULTURAL LIMESTONE
CRUSHED STONE

Distributors for

American inc sales company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 21.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 12, 12% Si, 25.00; No. 43, 5% Si, 24.60; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 26.50; No. 195, 4.5% Cu, 0.8% Si, 25.90; No. 214, 3.8% Mg, 26.40; No. 356, 7% Si, 0.3% Mg, 24.90.

Antimony: R.M.M. brand, 99.5%, 25.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $73.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. Valley; 36.00 deld. Midwest; Lake, 36.00 deld; Fire refined, 35.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $50-$100 nom. per troy oz.

Lead: Common, 14.60, chemical, 14.90, corroding, 14.90, St. Louis. New York basis, add 0.20.

Lithium: 99%+, cups or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.ob. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 28.50; notched ingot, 29.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingots; for Los Angeles, add 2.50 for both pig and ingot. Sticks 1.5 in. diameter, 49.00, 100 to 4000 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R, 34.00; alloy M, 36.00, 10,000 lb or more,, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $262-$264 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.00 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.90; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $80-$85 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $115-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 98.25; prompt, 98.00.

Titanium: Sponge, 99.2+ %, grade A-1 ductile (0.3% Fe max), $3.95, grade A-2 (0.5% Fe max), $3.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.35-$4.40 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $4.60. Treated ingots, $6.70.

Zinc: Prime Western, 12.50; brass special, 12.75; intermediate, 13.00, E. St. Louis, freight allowed over 0.50 per pound. High grade, 13.85; special high grade, 14.00, deld. Diecasting alloy ingot No. 3, 16.50; Nos. 2 and 5, 17.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $7.50 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50. (Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 28.75-30.75; No. 12 foundry alloy (No. 2 grade), 27.50-28.00; 5% silicon alloy, 0.60 Cu max, 29.25-30.25; 13 alloy, 0.60 Cu max, 29.50-30.25; 195 alloy, 29.25-30.25; 108 alloy, 28.00-28.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 29.50-29.50; grade 2, 27.50-28.50; grade 3, 26.50-27.50; grade 4, 26.00.

Brass Ingot: Red brass, No. 115, 37.50; tin bronze No. 225, 49.50; No. 245, 42.75; high-leaded tin bronze No. 305, 40.75; No. 1 yellow No. 406, 31.75; manganese bronze No. 421, 34.75

Magnesium Alloy Ingot: AZ63A, 22.00; AZ91B, 22.00; AZ91C, 22.00; AZ92A, 32.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.74; rod, bar, wire, $1.71.

COPPER WIRE

Bare, soft, f.ob. eastern mills, 100,000-lb lots, 41.35; 30,000-lb lots, 41.48; l.c.l, 41.98. Weatherproof, 100,000-lb, 40.78; 30,000 lb, 41.02; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.15; l.c.l., 48.90.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $20 per cwt; pipe, full coils, $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $5.75; hot-rolled and forged bars, $5.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.00-20.50; plates, 19.00-

ZIRCONIUM

Plate, $23; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	99	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	133
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0	...	...
0.156-0.179	55.9	52.3	...	...
0.188	53.9	52.3	...	66.5
0.219-0.234	51.1	49.5	...	...
0.250-0.281	51.1	49.5	...	63.7
0.313	51.1	49.5	...	60.6
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	52.1	50.6
1.063	48.7	46.3	...	48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4	...	...
1.625-2.000	45.1	42.8	...	47.2
2.125-2.500	44.9	41.7	...	...
2.563-3.375	42.7	40.5	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	35.9	40.4	...	...
0.135-0.096	36.4	41.3	...	...
0.095-0.077	37.1	42.3	34.6	39.6
0.076-0.061	37.7	43.2	34.8	39.8
0.060-0.048	38.2	43.6	35.1	40.2
0.047-0.037	38.7	44.5	35.6	40.6
0.037-0.030	39.1	45.0	36.0	41.3
0.029-0.024	39.7	45.5	36.3	41.8
0.023-0.019	40.4	46.9	37.1	42.6
0.018-0.017	41.2	...	37.7	43.5
0.016-0.013	42.1	...	38.5	44.7
0.014	42.1	...	39.5	46.0
0.013-0.012	44.3	...	40.2	47.0
0.011	45.3	...	41.4	48.6
0.010-0.0095	46.6	...	42.5	50.2
0.009-0.0085	47.8	...	44.0	52.3
0.008-0.0075	49.4	...	45.2	54.1
0.007	50.9	...	46.7	56.4
0.006	52.5	...	48.1	61.4

*45 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72.240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.6	38.8
5050-F	35.7	39.9
3004-F	38.7	41.6
5052-F	38.4	43.4
6061-T6	39.6	44.0
2024-T4*	41.8	47.9
7075-T6*	49.6	56.2

*24-48 in. widths or diam, 72-180 in. legths.

ALUMINUM

Forging Stock: Round, Class 1, 47.80-37.30, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.60-41.00 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.10	2	$ 49.55
1	25.35	4	136.65
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; ft and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 50.00, 20,000 lb or more, 0.250 in. and over, widths to 46 in., lengths to 144 in.; raised pattern floor plate, 62.00, 30,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; 2 in., 66.50. Tubing, 1 in. OD x 0.065 in., 90.00. Angles, 1 x 1 x ⅛-in., 75.90; 2 x 2 x ¼-in., 70.00. Channels, 5 in., 70.90. I-beams, 5 in., 70.20.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.50-18.00; old sheets, 14.50-16.00; borings and turnings, 9.00-10.50; crankcases, 14.50-16.00; industrial castings, 14.50-16.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.76b	52.34c	....	54.82	32.000	32.000	31.250
Yellow Brass	46.27	37.25d	46.81	49.18	23.875	23.625	22.000
Red Brass, 85%	50.99	50.93	51.53	52.80	28.125	27.875	27.375
Low Brass, 80%	49.75	49.60	50.29	52.56	27.000	26.750	26.750
Naval Brass	49.99	44.30	57.05	53.15	22.125	21.875	21.375
Com. Bronze, 90%	52.78	52.72	54.32	55.84	29.250	29.000	28.500
Nickel Silver, 10%	60.20	62.63g	62.53	....	27.625	27.375	13.813
Phos. Bronze, A, 5%	73.03	73.53	73.53	74.71	32.250	32.000	31.000
Silicon Bronze	55.82	56.01	54.86	60.80e	31.125	30.875	30.125
Manganese Bronze	53.73	47.83	58.24	....	22.125	21.875	21.375
Munts Metal	48.14	43.95	....	....	22.375	22.125	21.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: No. 1 heavy copper and wire, 34.50-35.00; No. 2 heavy copper and wire, 33.50-34.00; light copper, 31.50-32.00; No. 1 composition red brass, 27.50-28.00; No. 1 composition turnings, 26.50-27.50; yellow brass turnings, 16.50-17.00; new brass clippings, 22.00-23.00; light brass, 16.50-17.50; heavy yellow brass, 20.00-20.50; new brass rod ends, 21.00-22.00; auto radiators, unsweated, 21.00-21.50; cocks and faucets, 22.00-22.50; brass pipe, 22.00-23.00.

Lead: Heavy, 11.50-12.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.25; electrotype, 12.00-12.50; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 38.50-42.00; old sheets, 34.00-36.00; turnings, 29.50; rods, 38.50-42.00.
Nickel: Sheets and clips, 80.00-90.00; rolled anodes, 80.00-90.00; turnings, 65.00-75.00; rod ends, 80.00-90.00.
Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 5.00-5.50; old die-cast scrap, 3.50-3.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 21.00; 3003 clippings, 20.75-21.00; 6151 clippings, 20.50-21.50; 5052 clippings, 20.50-21.50; 2014 clippings, 20.00; 2017 clippings, 20.00; 2024 clippings, 20.00; mixed clippings, 20.00-20.50; old sheet, 16.50-17.50; old cast, 17.50; clean old cable (free of steel), 20.50-21.00; borings and turnings, 17.50-18.50.
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 48.00; light scrap, 43.00.
Copper and Brass: No. 1 copper, 38.00; No. 2 copper, 36.50; light copper, 34.50-34.75; refinery brass (60% copper) per dry copper content, 33.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 copper, 37.50; No. 2 copper, 36.00; light copper, 34.00-34.25; No. 1 composition borings, 30.00-30.50; No. 1 composition solids, 30.50-31.00; heavy yellow brass solids, 22.50-23.50; yellow brass turnings, 21.50; radiators, 23.50-24.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.
Copper: Flat-rolled, 51.42, oval, 50.92, 5000-10,000 lb; electrodeposited, 45.78, 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.
Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.
Tin: Bar or slab, less than 200 lb, $1.175; 200-499 lb, $1.16; 500-999 lb, $1.155; 1000 lb or more, $1.15.
Zinc: Bar, 21.00; bar or flat top, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.
Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.
Copper Cyanide: 100 lb, 76.80; 200 lb, 76.05; 300 lb, 75.80; 400-900 lb, 75.05; 1000 lb and over, 73.05; effective Mar. 24, 1955.
Copper Sulphate: Crystal, 100 lb, 21.50; 200 lb, 18.50; 300 lb, 17.50; 400 lb, 17.00; 500-1900 lb, 15.50; 2000-10,000 lb, 15.25; 10,000 lb and up, 15.15. Powder, add 0.5 to above prices. Effective Mar. 29, 1955.
Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.
Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.
Silver Cyanide: (Cents per ounce) 4-oz bottle, 83.125; 16-oz bottle, 81.875; 80-oz bottle, 79.375; 100-oz bottle, 79.375; f.o.b. St. Louis, New York and Los Angeles. Effective Apr. 6, 1955.
Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.50; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.
Sodium Stannate: Less than 100 lb, 74.00; 100-600 lb, 59.60; 700-1900 lb, 57.10; 2000-9900 lb, 55.30; 10,000 lb or more, 54.20.
Stannous Chloride (Anhydrous): Less than 50 lb, $1.606; 50 lb, $1.264; 100-300 lb, $1.116; 400-900 lb, $1.092; 1000-1900 lb, $1.068; 2000-4900 lb, $1.031; 5000-19,900 lb, 97.90; 20,000 lb or more, 90.90.
Stannous Sulphate: Less than 50 lb, $1.304; 50 lb, $1.004; 100-1900 lb, 98.40; 2000 lb or more, 96.40.
Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb 50 lb, 93.70; 100-1900 lb, 96.70; 2000 lb or and over, 52.30.

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Almet Stainless Steels

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Does your Fine Wire application call for resistance to heat? . . . to corrosion? Does it require good fatigue properties . . . excellent weaving or other forming characteristics? There's a good chance you will find the material you need among the more than 20 grades of stainless steel we fabricate into high quality Fine Wire. No other family of metals has the combination of properties common to the stainless steels.

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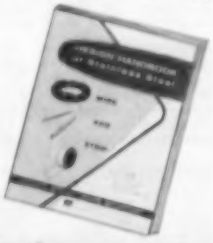

ALLOY METAL WIRE DIVISION

HKP

H. K. PORTER COMPANY, INC.
Prospect Park, Pennsylvania

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown *italics*. Code numbers following mill points indicate producing company. Key on page 107. Key to footnotes, page 109.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $65.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

BILLETS, BLOOMS & SLABS
Carbon, rerolling (NT)

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeprot,Conn. N19 .. 69.00
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 76.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 .. 68.50
LoneStar,Tex. L6 ..... 70.00
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
So.Chicago,Ill. R2, U5 .. 68.50
So.Duquesne,Pa. U5 .. 68.50
Youngstown R2 ..... 68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 83.00
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 85.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 .. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 92.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston S5 ..... 89.50
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2 .. 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
So.Chicago R2,U5,W14 84.50
So.Duquesne,Pa. U5 .. 84.50
So.SanFrancisco B2 ... 94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 .. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 115.00
Gary,Ind. U5 ..... 96.00
Houston S5 ..... 101.00
Ind.Harbor,Ind. Y1 ..... 96.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
So.Chicago R2,U5,W14 96.00
So.Duquesne,Pa. U5 .. 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
So.Chicago R2, W14... 103.50
So.Duquesne,Pa. U5 .. 103.50

SKELP

Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.30
Munhall,Pa. U5 ..... 4.225
SparrowsPoint,Md. B2.. 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 ... 4.225

WIRE RODS

AlabamaCity,Ala. R2 .. 5.025
Aliquippa,Pa. J5 ..... 5.025
Alton,Ill. L1 ..... 5.20
Buffalo B11, W12 ..... 5.025
Cleveland A7 ..... 5.025
Donora,Pa. A7 ..... 5.025
Fairfield,Ala. T2 ..... 5.025
Houston S5 ..... 5.275
IndianaHarbor,Ind. Y1 5.025
Johnstown,Pa. B2 ..... 5.025
Joliet,Ill. A7 ..... 5.025
KansasCity,Mo. S5 ..... 5.275
Kokomo,Ind. C16 ..... 5.125
Los Angeles B3 ..... 5.825
Minnequa,Colo. C10 .... 5.275
Monessen,Pa. P7 ..... 4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ... 5.675
Portsmouth P12 ..... 5.025
Roebling,N.J. R5 ..... 5.125
So.Chicago,Ill. R2 ..... 5.025
SparrowsPoint,Md. B2.. 5.125
Sterling,Ill.(1) N15 .... 5.025
Sterling,Ill. N15 ..... 5.125
Struthers,O. Y1 ..... 5.025
Worcester,Mass. A7 ... 5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 4.60
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.25
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston S5 ..... 4.70
Ind.Harbor,Ind. I-2 .... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. S5 ..... 4.70
Lackawanna,N.Y. B3 .... 4.60
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 .... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 4.90
Portland,Oreg. O4 ..... 5.35
Phoenixville,Pa. P4 .... 4.65
Seattle B3 ..... 5.25
So.Chicago U5, W14 .... 4.60
So.SanFrancisco B3 .... 5.25
Torrance,Calif. C11 .... 5.30
Weirton,W.Va. W6 ..... 4.60

Wide Flange

Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.40
Lackawanna,N.Y. B2 .... 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 .... 4.65
So.Chicago,Ill. U5 ..... 4.60

Alloy Std. Shapes

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.30
Gary,Ind. U5 ..... 5.65
Houston S5 ..... 5.75
Munhall,Pa. U5 ..... 5.65
So.Chicago,Ill. U5 ..... 5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.675
Houston S5 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 ..... 6.85
Lackawanna,N.Y. B2 ... 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
So.Chicago,Ill. U5, W14 6.75
So.SanFrancisco B3 .... 7.40
Struthers,O. Y1 ..... 6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 .. 6.80
Munhall,Pa. U5 ..... 6.75
So.Chicago,Ill. U5 ..... 6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 .. 4.85
Munhall,Pa. U5 ..... 4.80
So.Chicago,Ill. U5 ..... 4.80

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .... 5.45
Lackawanna,N.Y. B2 .... 5.45
Munhall,Pa. U5 ..... 5.45
So.Chicago,Ill. U5 ..... 5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 .... 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 ..... 4.50
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 .... 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 ... 5.15
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 ..... 4.70
Harrisburg,Pa. C5 ..... 4.50
Houston S5 ..... 4.60
Ind.Harbor,Ind. I-2, Y1 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B3 .... 4.50
LoneStar,Tex. L6 ..... 4.55
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 .... 5.25
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.50
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
So.Chicago R2, U5, W14 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 .... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 ..... 4.50
Youngstown R2, U5, Y1 4.50

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ..... 6.30
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 10.40

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Coatesville,Pa. L7 ..... 6.725
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1.. 7.375
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston S5 ..... 6.825
Ind.Harbor,Ind. I-2, Y1. 6.725
Johnstown,Pa. B2 ..... 6.725
LosAngeles B3 ..... 7.625
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
So.Chicago,Ill. U5, W14 6.725
SparrowsPoint,Md. B2.. 6.725
Youngstown U5, Y1 ... 6.725

PLATES, Alloy

Bridgeport,Conn. N19 .. 6.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 6.95
Gary,Ind. U5 ..... 6.30
Houston S5 ..... 6.40
Ind.Harbor,Ind. Y1 .... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
So.Chicago,Ill. U5, W14 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

FLOOR PLATES

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. C5 ..... 5.575
Ind.Harbor,Ind. I-2 .... 5.575
Munhall,Pa. U5 ..... 5.575
So.Chicago,Ill. U5 .... 5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10... 4.75
Ashland l.c.l. (15) A10.. 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ..... 4.65
Aliquippa,Pa. J5 ..... 4.65
Alton,Ill. L1 ..... 4.85
Atlanta A11 ..... 4.85
Bessemer,Ala. T2 ..... 4.65
Birmingham C15 ..... 4.65
Bridgeport,Conn. N19 .. 4.80
Buffalo R2 ..... 4.65
Canton,O. R2 ..... 4.75
Clairton,Pa. U5 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 .... 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind. U5 ..... 4.65
Houston S5 ..... 4.90
Ind.Harbor,Ind. I-2, Y1. 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. S5 .... 4.90
Lackawanna,N.Y. B2 .... 4.65
LosAngeles B3 ..... 5.35
Massillon,O. R2 ..... 4.75
Midland,Pa. C18 ..... 4.65
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.00
N.Tonawanda,N.Y. B11.. 4.30
Pittsburg,Calif. C11 ... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
Seattle B3, N14 ..... 5.40
So.Chicago R2, U5, W14 4.65
So.Duquesne,Pa. U5 .... 4.65
So.SanFran.,Calif. B3.. 5.40
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Warren,O. R2 ..... 4.65
Weirton,W.Va. W6 ..... 4.65
Youngstown R2, U5 .... 4.65

BARS, H.R. Loaded

Warren,O. C17 ..... 6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .... 5.575
Bridgeport,Conn. N19 .. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 .... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fontana,Calif. K1 .... 6.625
FairlessHills,Pa. U5 .. 5.725
Gary,Ind. U5 ..... 5.575
Houston S5 ..... 5.825
Ind.Harbor,Ind. I-2, Y1 5.575
Johnstown,Pa. B2 .... 5.575
KansasCity,Mo. S5 .... 5.825
Lackawanna,N.Y. B2 .. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
So.Chicago R2,U5,W14 5.575
So.Duquesne,Pa. U5 ... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
Ind.Harb.,Ind. I-2, Y1. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 .... 7.05
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
So.Chicago W14 ..... 6.80
So.Duquesne,Pa. U5 .... 6.80
So.SanFrancisco B3 .... 7.50
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ..... 4.60

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 4.85
Fontana,Calif. K1 ..... 5.35
Niles,Calif. P1 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SanFrancisco S7 ..... 5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.65
Gary,Ind. U5 ..... 5.65
Houston S5 ..... 5.90
KansasCity,Mo. S5 .... 5.90
Youngstown U5 ..... 5.65

BARS, C.F. Loaded

Ambridge,Pa. W18 .... 7.325
Camden,N.J. P13 ..... 8.50
Chicago W18 ..... 7.325
Cleveland C20 ..... 7.85
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 7.70
SpringCity,Pa. K3 ..... 8.50
Warren,O. C17 ..... 8.225

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 5.90
BeaverFalls,Pa. M12,R2 5.90
Buffalo B5 ..... 5.95
Camden,N.J. P13 ..... 6.35
Carnegie,Pa. C12 ..... 5.90
Chicago W18 ..... 5.90
Cleveland A7, C20 ..... 5.90
Detroit R7 ..... 5.90
Detroit B5, P17 ..... 6.10
Donora,Pa. A7 ..... 5.90
Elyria,O. W8 ..... 5.90
FranklinPark,Ill. N5 .... 5.90
Gary,Ind. R2 ..... 5.90
GreenBay,Wis. F7 ..... 5.90
Hammond,Ind. L2, M13.. 5.90
Hartford,Conn. R2 ..... 6.40
Harvey,Ill. B5 ..... 5.90
LosAngeles R2 S30 ..... 7.35
Mansfield,Mass. B5 .... 6.45
Massillon,O. R2, R8 .. 5.90
Midland,Pa. C18 ..... 5.90
Monaca,Pa. S17 ..... 5.90
Newark,N.J. W18 ..... 6.35
NewCastle,Pa.(17) B4 .. 5.90
Pittsburgh J5 ..... 5.90
Plymouth,Mich. P5 .... 6.15
Putnam,Conn. W18 .... 6.45
Readville,Mass. C14 .... 6.45
So.Chicago,Ill. W14 .... 5.90
SpringCity,Pa. K3 .... 6.35
Struthers,O. Y1 ..... 5.90
Waukegan,Ill. A7 ..... 5.90
Worcester,Mass. W19 ... 6.35
Youngstown F3, Y1 .... 5.90

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md. C19 .. 5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 .... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 ..... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2,M13. 7.425
Hartford,Conn. R2 .... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 .. 7.725
Massillon,O. R2, R8 .. 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 .... 7.625
So.Chicago W14 ..... 7.425
SpringCity,Pa. K3 .... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 .. 7.725
Youngstown F3, Y1 ... 7.425

BARS, Reinforcing
(To Fabricators)

Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 4.85
Birmingham C15 ..... 4.65
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 ... 4.80
Fontana,Calif. K1 ..... 5.35
Ft.Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston S5 ..... 4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 ....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 ....5.35
Milton,Pa. M18 ....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 ....5.00
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 ....4.65
Portland,Oreg. O4 ....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 ....5.40
So.Chicago R2 ....4.65
So.Duquesne,Pa. U5 ....4.65
So.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 ....4.75
Struthers,O. Y1 ....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 ..6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 ....5.55
Pittsburgh U8 ....6.17
Seattle B3, N14 ....6.60
SparrowsPt. ½-1" B2 ..6.15
Williamsport,Pa. S19 ....6.00

RAIL STEEL BARS

Avis,Pa. (3) J8 ....4.25
ChicagoHts.(3) C2, I-2..4.55
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..4.95
Franklin,Pa.(3) F5 ....4.55
Franklin,Pa.(4) F5 ....4.65
Marion,O.(3) P11 ....4.20
Moline,Ill.(3) R2 ....4.65
Tonawanda(3) B12 ....4.50
Tonawanda(4) B12 ....4.65
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(B.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks.(S.R.) L5 ...11.50
McKRks.(D.R.) L5 ....16.00
McK.Rks.(Staybolt) L5..17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 ....4.325
Allenport,Pa. P7 ....4.325
Ashland,Ky.(8) A10 ...4.325
Cleveland J5, R2 ....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 ....4.425
Dravosburg,Pa. U5 ..4.325
Ecorse,Mich. G5 ....4.425
Fairfield,Ala. T2 ....4.325
FairlessHills,Pa. U5 ..4.375
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 ....4.325
Geneva,Utah C11 ....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 ....4.425
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 ....4.325
Newport,Ky.(8) N9 ..4.325
Niles,O. N12 ....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 ....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 ....4.325
Sharon,Pa. S3 ....4.325
So.Chicago,Ill. W14 ..4.325
SparrowsPoint,Md. B2..4.325
Steubenville,O. W10 ..4.325
Warren,O. R2 ....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ..4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ....5.625
Kokomo,Ind. C16 ....5.475
Niles,O. N12 ....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 ....7.20

SHEETS, H.R. (14 Ga.&Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ....6.375
Ecorse,Mich. G5 ....6.475
Fairfield,Ala. T2 ....6.375
FairlessHills, Pa. U5 ..6.425
Fontana,Calif. K1 ....7.125
Gary,Ind. U5 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
Sharon,Pa. S3 ....6.375
So.Chicago,Ill. U5 ....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 ....6.375
Weirton,W.Va. W6 ..6.375
Youngstown U5, Y1 ..6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(6) A10 ...4.575
Cleveland R2 ....4.925
Ind.Harbor,Ind. I-2 ..4.575
Warren,O. R2 ....4.925

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 ....5.325
Cleveland J5, R2 ....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 ....5.325
Ecorse,Mich. G5 ....5.425
Fairfield,Ala. T2 ....5.325
FairlessHills,Pa. U5 ...5.375
Follansbee,W.Va. B20 ..5.325
Fontana,Calif. K1 ....6.425
Gary,Ind. U5 ....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 ....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 ....5.325
Pittsburg,Calif. C11 ...6.275
Pittsburgh J5 ....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ..5.325
Warren,O. R2 ....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 ....5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ....7.875
Dravosburg,Pa. U5 ..7.875
Ecorse,Mich. G5 ....7.975
FairlessHills,Pa. U5 ..7.925
Fontana,Calif. K1 ....8.975
Gary,Ind. U5 ....7.875
IndianaHarbor,Ind. Y1..7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 ....7.875
SparrowsPoint(36) B2..7.875
Warren,O. R2 ....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 ....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)

	Cu	Cu Fe
Ashland,Ky.	A10 6.90	...
Canton,O.	R2 ...6.50	7.10
Dravosburg	U5 ..6.10	...
Fairfield	T2 ....6.10	...
Gary,Ind.	U5 ...6.10	6.35
Ind.Harbor	I-2 ..6.10	6.35
Kokomo,Ind.	C16 6.20	...
MartinsFry.	W10 6.10	...
Newport,Ky.	N9 ..6.10	6.35
Pitts.,Calif.	C11 .6.85	...
SparrowsPt.	B2..6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ....7.15
Gary,Ind. U5 ....5.95
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 ....5.85‡
Ashland,Ky. A10 ....585†
Canton,O. R2 ....5.85‡
Delphos,O. N16 ....6.60‡
Dover,O. R1 ....5.85‡
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 ....5.85†
Gary,Ind. U5 ....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ..5.85†
Kokomo,Ind. C16 ....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 ....5.85‡
Niles,O. N12 ....6.85‡
Pittsburg,Calif. C11 ..6.60*
SparrowsPt.,Md. B2 ..5.85†
Steubenville,O. W10 ..5.85‡
Warren,O. R2 ....5.85†
Weirton,W.Va. W6 ..5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ....6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 ....6.60
Newport,Ky. N9 ....6.25
Niles,O. N12 ....7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ....6.30
Niles,O.(28) R2 ....6.30
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.50
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ....5.90
Cleveland R2 ....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 ....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. N12 ....5.90
Youngstown Y1 ....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. B20 ..7.75
Yorkville,O. W10 ....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ....6.25
Mansfield,O. E6 ....6.25
Middletown,O. A10 ....6.25
Niles,O. N12 ....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
B20 Berkman Co., Louis

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forginga Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T8 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Alliance,Pa. P7	*4.325*
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.325
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(25) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
NewBritain(10) S15	4.325
N.Tonawanda,N.Y. B11	4.05
Pittsburg,Calif. C11	5.075
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
SanFrancisco S7	*5.05*
Seattle (25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
So.Chicago,Ill. W14	4.325
So.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N10	7.50
Carnegie,Pa. S18	*7.20*
Fontana,Calif. K1	8.85
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
So.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.426
Ecorse,Mich. G5	6.526
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.526
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
So.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.675
Warren,O. R2	4.925

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Cleveland J5	6.45
Cleveland A7	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. B20	*6.25*
Fontana,Calif. K1	*8.00*
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.45
Indianapolis C8	*6.40*
Lackawanna,N.Y. B2	6.45
LosAngeles C1	8.50
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	7.00
NewHaven,Conn. D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.40
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.45
Portsmouth,O. P13	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt., Md. B2	6.45
Trenton,N.J.(31) R5	*8.00*
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	*6.25*
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	7.10
Youngstown Y1	6.45
Youngstown C8	*6.25*

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	*13.45*
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	*13.60*
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	*13.45*

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.30
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	....
Carnegie,Pa. S18	...	*8.95*	*10.50*	*12.65*	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. B20	*7.40*	*8.95*	*10.50***	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	*7.35*	*9.10*	*10.50*	*12.65*	*15.35*
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4	7.00	8.95	10.50	12.65	....
NewCastle,Pa. E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5		*9.25*	*10.80*	*12.95*	*15.65*
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	*7.00*	*8.95*	*10.50*	*12.65*	*15.35*
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	*7.00*	*8.95*	*10.50*	*12.65*	*15.35*

**0.065 C. max.

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	*14.40*	*17.60*	*21.00*
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Youngstown C8	...	...	*14.75*	*17.95*	*21.35*

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric Motor		Dynamo
BeechBottom,W.Va. W10	....	....	...	9.95	10.95 11.85
Brackenridge,Pa. A4	....	....	...	9.10	10.10 11.00
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	....	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	....	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½¢ lower)	Field	Armature	Electric Motor		Dynamo
Brackenridge,Pa. A4	....	....	....	9.85	10.85 11.75
GraniteCity,Ill. G4	8.80*	9.60*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60*
Vandergrift,Pa. U5	8.40*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	....	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.35
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.35
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils annealed, semiprocessed ½¢ lower.

Lackawanna,N.Y. B2	9.125
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.125
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.40*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.55*
Youngstown C8	*6.25**
Warren,O. T5	*6.25**
Warren,O. R9	*6.45**
Weirton,W.Va. W6	5.75*
Worcester,Mass. A7	7.30*

*Plus galvanizing extras.

Strip, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	*4.75*

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Dravosburg,Pa. U5	7.50	7.75	8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (23-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Dravosburg,Pa. U5	8.80	9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.80	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Pitts,Calif. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Dravosburg,Pa. U5	6.60
Fairfield,Ala. T2	6.70
FairlessHills,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$7.85
Gary,Ind. U5	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.25
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.425
Atlanta A11	6.45
Bartonville,Ill. K4	*6.35*
Buffalo W12	6.25
Chicago W13	6.25
Cleveland A7	6.25
Crawfordsville,Ind. M8	6.35
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fairfield,Ala. T2	6.25
Fostoria,O.(24) S1	*6.45*
Houston S5	6.50
Jacksonville,Fla. M8	6.77
Johnstown,Pa. B2	6.25
Joliet,Ill. A7	6.25
KansasCity,Mo. S5	6.50
Kokomo,Ind. C16	6.35
LosAngeles B3	7.20
Minnequa,Colo. C10	6.50
Monessen,Pa. P7	5.75
Newark 6-8 ga, I-1	6.90
No.Tonawanda B11	5.75
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.25
Rankin,Pa. A7	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Sterling,Ill.(1) N15	6.25
Sterling,Ill. N15	6.35
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	*8.00*
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	*7.95*
Johnstown,Pa. B2	7.90
LosAngeles B3	8.55
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.90
Roebling,N.J. R5	*8.20*
So.Chicago,Ill. R2	7.90
So.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester J4	7.50
Worcester A7, T6, W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.50
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.60
Roebling,N.J. R5	*7.90*
So.Chicago,Ill. R2	7.60
So.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	*12.65*
Buffalo W12	12.35
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	*12.55*
Jacksonville,Fla. M8	13.08
Johnstown,Pa. B2	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P16	12.56
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	*12.85*
So.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. T6	12.85
Worcester,Mass. A7	12.80

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	*10.70*
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Portsmouth,O. P12	10.70
Roebling,N.J. R5	*11.00*
SparrowsPt.,Md. B2	10.80

ROPE WIRE (A)

Bartonville,Ill. K4	*10.55*
Buffalo W12	9.75
Fostoria,O.(23) S1	*10.55*
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	*10.85*
SparrowsPt. B2	10.05
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Alton,Ill. L1	14.22‡
Bartonville,Ill. K4	*14.15*
Monessen,Pa. P16	14.20
Rockling,N.J. R5	*14.35*

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fosteria,O. S1	*9.00*
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	7.95
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	*9.30*
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	*154*
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	137
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
So.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	*154*
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	137
Pittsburg,Calif. C11	171
Rankin,Pa. A2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Hot Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$8.77
Bartonville,Ill. K4	*9.45*
Buffalo W12	9.35
Crawfordsville,Ind. M8	*9.46*
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
So.Chicago,Ill. R2	8.77
SparrowsPt., B2	9.45
Sterling,Ill. N15	*9.35*

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.05
Bartonville,Ill. K4	*9.75*
Buffalo W12	9.60
Crawfordsville,Ind. M8	*9.75*
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B2	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
So.Chicago,Ill. R2	9.05
SparrowsPt. B2	9.75
Sterling,Ill. N15	*9.65*

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.10
Bartonville,Ill. K4	*9.80*
Buffalo W12	9.70
Crawfordsville,Ind. M8	*9.80*
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	11.05
Minnequa,Colo. C10	9.95
So.Chicago,Ill. R2	9.10
SparrowsPt. B2	9.80
Sterling,Ill. N15	*9.70*

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172‡
Atlanta A11	181
Bartonville,Ill. K4	*181*
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
So.Chicago,Ill. R2	169**
So.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179*

WOVEN Fence, 9-15 Ga.

	Col.
Ala.City,Ala R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliqppa.Pa.9-14½ga. J5	165‡
Atlanta A11	168
Bartonville,Ill. K4	*168*
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	149
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
So.Chicago,Ill R2	146**
Sterling,Ill.(1) N15	166*

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	13.15	14.70**
Bartonville,Ill. K4	*14.60*	*16.50*
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville M8	14.60	16.50
Fosteria,O. S1	*14.60*	*16.15†*
Johnstown B2	14.15	16.40*
Kokomo C16	*14.60*	*16.15†*
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.40
Waukegan A7	14.50	16.05†
Worcester A7	14.80	
Ala.City,Ala. R2	7.40	7.80**

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Aliquippa J5	7.40 7.925‡
Atlanta A11	7.50 8.075
Bartonville(48) K4	*7.50 8.075*
Buffalo W12	7.40 8.80†
Cleveland A7	7.40
Crawfordsville M8	7.50 8.075
Donora,Pa. A7	7.40 7.80†
Duluth,Minn. A7	7.40 7.80†
Fairfield T2	7.40 7.80†
Houston,Tex. S5	7.65 8.05†
Jacks'ville,Fla. M8	7.90 8.475
Johnstown B2(48)	7.40 7.975*
Joliet,Ill. A7	7.40 7.80†
KansasCity,Mo. S5	7.65 8.05†
Kokomo C16	7.50 7.90†
LosAngeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen P7 (45)	6.90 7.45
Palmer,Mass. W12	7.70 8.10†
Pitts.,Calif. C11	8.35 8.75†
Portsmouth,O. P12	7.40
Rankin A7	7.40 7.80†
So.Chicago R2	7.40 7.80**
So.S.Fran. C10	8.35 8.75**
Spar'wsPt.B2(48)	7.50 8.075*
Str'ling(1)(48)N15	7.40 7.975*
Struthers,O.(48)Y1	7.40 7.90†
Worcester,Mass.A7	7.70

*Based on 12.50c zinc; †5c zinc; ‡10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	173
Atlanta A11	175
Bartonville,Ill. K4	*175*
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth,Minn. A7	173
Fairfield,Ala. T2	173
Joliet,Ill. A7	173
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	197
So.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	175
Sterling,Ill.(1) N15	173

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter:	
½-in. & smaller diam	2
Over 4 in. through 6 in.:	
½ in. & smaller diam	+3
6 in. and shorter:	
⅝-in. and ⅝-in.	+4
¾-in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoe	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex, regular & heavy:	
⅝" and smaller	55
⅞" to 1⅛", inclusive	58
1⅛" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
⅝" or smaller	38
⅞" to 1½", inclusive	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	56

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)	
1 in. diam x 6 in. and shorter	34
1 in. and smaller diam x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)	
No. 10 and smaller	34
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)	
Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)	
6 in. or shorter:	
¼-in. through ⅝-in.	38
¾-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
¾-in. through 1 in.	7

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	20.41
1¼	13	....	23.21	20.44
1½	13	21.40	25.65	22.60
1¾	13	25.28	30.31	26.71
2	13	28.33	33.97	29.93
2¼	13	31.91	38.26	33.72
2¼	12	34.63	41.52	36.59
2½	12	38.15	45.74	40.31
2¾	12	41.31	49.53	43.65
3	12	44.05	52.82	46.54

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	...	5.65
Fairfield,Ala. T2	...	...	...	5.8
Gary,Ind. U5	4.725	...	...	...
Huntington,W.Va. W7	...	...	...	*5.65*
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	...	...	...	(16)5.65
Lackawanna,N.Y. B2	4.725	4.625	...	5.65
Minnequa,Colo. C10	4.725	4.625	...	6.15
Steelton,Pa. B2	4.725	4.625	...	...
Williamsport,Pa. S19	...	...	...	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	11.50
Seattle B3	12.90

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	7.90
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
So.Chicago,Ill. R2	7.90
Struthers,O. Y1	7.90
Youngstown K2	7.90

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98 + % Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.i.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	21.00
Annealed, 99.5% Fe,	36.50
Unannealed (99 + % Fe)	32.50
Unannealed (99 + % Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	21.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Atomized, 500 lb drums, frght. allowed	
Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	*39.00-49.00†*
Bronze, 5000-lb lots	*58.00-61.50†*
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	*53.25-60.00†*
Phosphor-Bronze, ¼-ton lots	86.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	51.35
Tin	14.50*
Zinc, 5000-lb lots	*18.25-12.00‡*
Tungsten Dollars	
Melting grade, 99% 60 to 200 mesh	4.30-4.40
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) *Flats only*: 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.15c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.60c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 7.10c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 6.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.35c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld to mill zone or within switching limits, 5.35c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		56.5c		76.5c		92c		$1.00		$1.46		$1.92	
Pounds Per Ft	3.66		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	16.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	...	10.5	...	13	...	16.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	16.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	16.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+1.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	....	....	....	....	....	....	....	....
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	....	....	....	....	....	....	....	....
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B3	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	5.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	....	....	....
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	9	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sparrows Pt., Md. B3	20.25	14.25	20.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	22.25	16.25	22.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (12.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.75	22.25	....	35.75	32.00	38.00	....	44.25	41.00
202	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
202B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	48.00	48.00
302	....	24.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	....	39.00	44.25	42.50	45.50	48.25	52.50	52.50
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	66.25	66.25
316L	....	....	56.50	65.00	63.50	66.00	69.50	73.50	73.50
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	36.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	31.00	40.50	48.75	56.25	54.25	57.00	62.00	70.50	70.50
403	....	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	26.00	30.50	31.75	36.25	36.25
414	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sheets Carbon Base 20%
Stainless:			
302	....	....	28.00
304	28.30	33.60	29.75
304-L	30.30	35.50	....
310	41.30	47.00	....
316	33.40	38.80	42.75
316-L	37.80	43.20	....
316-CB	38.90	45.50	....
321	30.00	35.30	34.25
347	32.20	38.60	44.25
405	23.90	31.10	....
410	23.40	30.60	....
430	23.40	30.60	24.25
Inconel	47.90	63.90	....
Nickel	39.50	54.10	....
Monel	40.80	54.80	....
L-Nickel	41.70	58.50	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled 10%	Strip, Carbon Base—Cold Rolled Both Sides
Copper*	26.60	33.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	*5% Cr Hot Work*	0.430-0.460
Extra Carbon	0.310	*W-Cr Hot Work*	0.450
Special Carbon	0.390	*V-Cr Hot Work*	0.470
Oil Hardening	0.430	*Hi-Carbon-Cr*	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
11.5	4	3	....	...	1.865
9	3.5	....	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.150
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Alabama City, Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00†	....
Woodward, Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda, N.Y. W12	58.50	59.00	59.50	60.00
No. Tonawanda, N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester, N.Y. deld.	61.52	62.02	62.52	....
Syracuse, N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Chicago R2	58.50	....	59.00	....
Gary, Ind. U5	58.50	....	59.00	....
So. Chicago, Ill. Y1	58.50	59.00	59.00	59.50
So. Chicago, Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	66.67	67.17	67.17	67.67
Muskegon, Mich., deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron, O., deld.	61.25	61.75	61.75	62.25
Lorain, O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem, Pa. B2	60.50	61.00	61.50	62.00
New York, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro, Pa. B10	60.50	61.00	61.50	62.00
Chester, Pa. C31	54.50	55.00	55.50	....
Philadelphia, deld.	56.16	56.66	57.16	....
Steelton, Pa. B2	60.50	61.00	61.50	62.00
Swedeland, Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy, N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
Neville Island, Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona, Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer, Pa. U5	58.50	....	59.00	59.50
Clairton, Rankin, So. Duquesne, Pa. U5	58.50	....	....	....
McKeesport, Pa. N3	58.50	....	....	59.50
Midland, Pa. C18	58.50	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard, O. Y1	....	....	59.00	....
Sharpsville, Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield, O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie, Pa. I-3	58.50	59.00	59.00	59.50
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	58.50	59.00	....	....
Granite City, Ill. G4	60.40	60.90	61.40	....
Ironton, Utah C11	58.50	59.00	....	....
Lonestar, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	60.50	61.00	61.50	....
Rockwood, Tenn. T3	....	55.00‡	59.00	....
Toledo, O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Low phos. southern grade.
†Phos., 0.30 max.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $3 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson, O. G2, J1	*$67.50*
Buffalo M1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, (Open-hearth & Fdry, freight allowed K2)	*87.50*
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frt allowed K2	*90.50*

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035 max.)	$72.50
Steelton, Pa. B2 (Phos. 0.035 max.)	66.50
Philadelphia, deld.	70.05
Troy, N.Y. R2 (Phos. 0.035 max.)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50

Warehouse Steel Products

Representative prices, cents per pound subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Buffalo, Cleveland, 30 cents; Chicago, Milwaukee, St. Louis, St. Paul, Detroit, Cincinnati, Pittsburgh, 25 cents; Philadelphia, New York, Baltimore, Boston, San Francisco, Los Angeles, and Portland, Oreg, 10 cents; Atlanta, Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Galv. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‖	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	6.79	7.75	8.37	42.43	7.05	...	6.92	8.89	....	7.08	7.09	8.83
Baltimore	7.03	8.32	9.00	....	7.85	...	7.61	8.62‡	13.44	7.93	7.21	8.87
Birmingham	6.70	7.80	8.85	....	6.95	...	7.00	9.35	....	7.20	7.05	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	13.45	8.13	7.89	9.36
Buffalo	6.80	7.90	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	7.70
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.80	7.93	8.50	46.06	7.06	...	7.06	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	7.92	8.90	46.10	7.30	...	7.32	8.05	14.09	7.75	7.28	8.71
Cleveland	6.80	7.93	8.85	....	7.16	...	7.14	7.85	12.91	7.61	7.16	...
Detroit	6.99	8.12	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.35	7.35	8.30	....	6.70	...	6.50	7.45*	....	6.69	6.52	7.64
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	...
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.02	8.50	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.60	....	7.04	6.87	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.95	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69
Pittsburgh	6.80	7.93	9.20	45.67	7.16	...	7.08	7.85	13.10	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	11.80	15.00	8.15	7.75	...
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.22	9.19	43.99	7.35	...	7.37	8.14	13.14	7.68	7.28	8.76
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.55	...
San Francisco	8.10	9.55	9.90	51.65	8.35	...	8.05	11.20	14.25§	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00‖	10.80	....	9.05	...	8.33	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.98	9.24

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; ‖under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 999 lb and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; §—500 to 9999 lb; ¶—400 to 999 lb; ¢—4000 lb and over; ‖—1000 to 1999 lb; ‖—1000 lb and over; †—1500 to 3999 lb; ‡—2000 to 3999 lb; ‖—f.o.b. local delivery in lots of 10,000 lb and over.

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...and GISHOLT SUPERFINISH
breaks another cost barrier!

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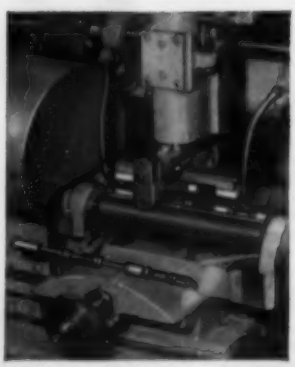
Here's an excellent case in point... on the record-breaking Douglas "Skyray." Among the most precise parts on this supersonic jet are the slide valves. They're ground from the solid, first on a cylindrical grinder, then on a centerless grinder. Then they're transferred to a Gisholt Superfinisher where the bearing surfaces get a finish of 3 micro-inches, r.m.s. Former time for hand-lapping ran from 2½ to 3 hours per piece. The Gisholt SUPERFINISHER does it in 45 seconds! Think of it: less than 1/200th of the time! And think what that does to costs!

If SUPERFINISH can improve your product, as probably it can, better get the facts. The complete story is in the booklet "Wear and Surface Finish." Ask us for your copy.



Approximate diam. of slide valves (lower left) is ½" with reduced diam. of ¼" between collars, or bearing surfaces. Parts are handled on the Gisholt Superfinisher in only 45 seconds per piece.

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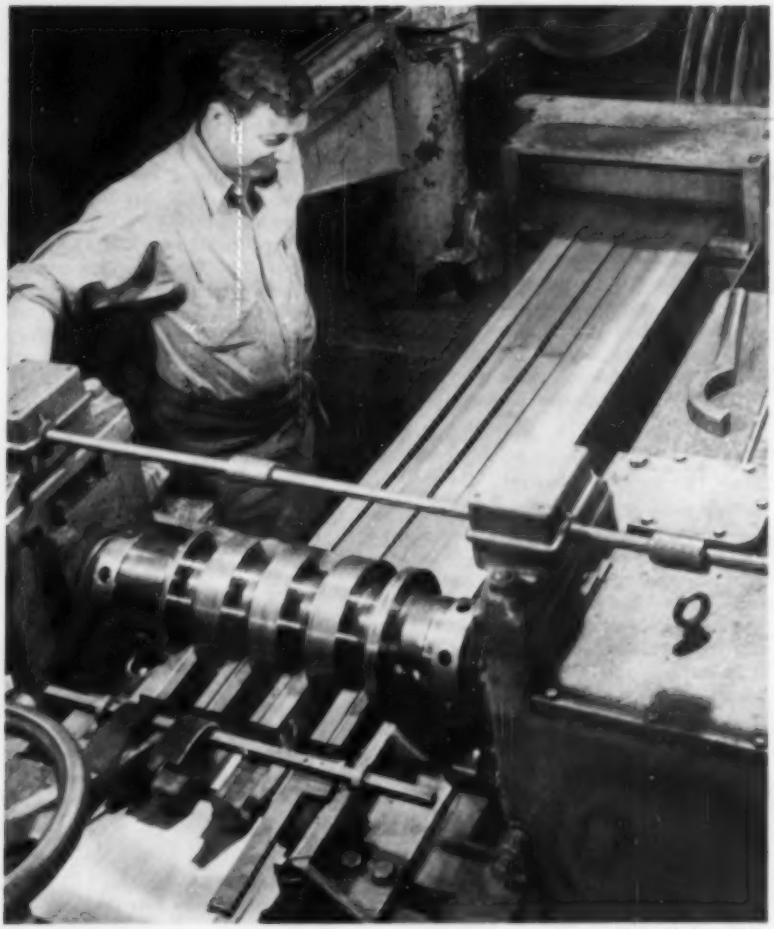

Pittsburgh Steel Corp.

Competition with slit sheet is the main reason why . . .

Strip Producers Back Down

LOOK TO COLD-ROLLED STRIP for prime evidence that old-fashioned competition still flourishes in the steel industry.

Consumers and several smaller producers didn't like the new prices posted by the largest steel producer in the wake of the labor settlement in early July. When the dust settled, it (and others) had to change course and revise downward to meet sturdy competition.

Here's how it happened: When steelmakers announced new price schedules in early July, U. S. Steel upped the tag on cold-rolled carbon strip steel $14 a ton—to $129 a ton at American Steel & Wire Division mills in Cleveland. Other leading producers followed suit, reflecting increased labor costs.

Quick Reaction—Consumers and several eastern and midwestern producers refused to fall into step. In the East, producers advanced prices $10 a ton because of pressure from consumers that felt the $14 increase was too steep to pass on to their customers. In the Midwest, Detroit Steel Corp., Detroit, announced an increase in base price of $10 a ton. Sharon Steel Corp., Sharon, Pa., reported a base price of 6.25 cents per pound at Sharon, the same level established by Detroit at Portsmouth, O.

Republic Steel Corp. and American Steel & Wire met rivals by lopping $4 off the announced $14 at Cleveland. Weirton and Great Lakes Steel Corp. also trimmed prices to meet the trend.

Sheet Rivalry—Underlying this competition between producers is the bid by narrow slit sheet for some applications of cold-rolled strip (see STEEL, Oct. 25, 1954, p. 249).

At the end of World War II, many warehouses in important industrial cities began to install slitters, to furnish sheet in narrow widths for fabricators that couldn't afford the equipment. With warehouse competition tightening in peacetime, distributors reduced slitting costs, while the differential between strip and sheet price increased. Strip costs more. It's made under precise rolling practices with more accurate width tolerances than slit sheet, has a specified temper and a variety of brighter, smoother finishes.

Change to Sheet—With hundreds of applications using strip, many fabricators have switched to slit sheet when they require a narrow band of steel with sheet instead of premium strip characteristics. The tendency to switch gets stronger each time the price differential rises.

Some sheet producers claim narrow slit sheet can serve about 85 per cent of the needs for narrow cold-rolled steel. While strip producers dispute this, slit sheet use has made substantial progress in the last ten years.

Percentage Declines—The result of this trend is that cold-finished strip makes up a smaller percentage of total steel shipments now than at any time since World War II. Some 1,281,993 tons were shipped in 1954, or 2 per cent of total shipments. This compares with 2,166,111 tons in 1953, comprising 2.7 per cent of the total, reports the American Iron & Steel Institute.

Don't underestimate over-all demand for cold-rolled strip in the many applications which call for a high-quality product. Among large consumers are producers of electric weld tubing, summer furniture, automakers, refrigerators and other appliances. Shoe shanks and lipstick cases are typical small-volume applications. Most of these consumers need strip's bright finish and close tolerances. But some will switch to slit sheet if the price differential between it and strip widens too far.

Heavy Sales—The cold-rolled strip market seldom has been stronger, and producers intend to keep sales healthy. "Orders are heavy in the third quarter, and we have yet to feel the full weight of automotive orders for next year's models," reports Sharon Steel.

Adds U. S. Steel: "There is no open space in the third quarter for sheet or strip orders. We look for a good fourth quarter, too. Inventories are generally low. Consumers can't stay out of the market for long."

Sheets, Strip . . .

Sheet & Strip Prices, Pages 167 & 168

Sellers of hot and cold-rolled sheets are experiencing no important cutbacks in orders from consumers. And retrenchments have more than offset new demands from other consum-

ing areas. Some mills are so oversold that they are being forced to trim fourth-quarter requests of customers as much as 30 to 35 per cent in some cases.

The scheduling problems resulting from being oversold are so complicated some producers haven't committed themselves definitely for the final quarter. On the other hand, a portion of those fully booked for the entire period are considering opening books for first-quarter 1956 business. Some are on a district quota basis for the period, consumers being allotted steel largely on the basis of their historic buying pattern.

In allocating fourth quarter sheet tonnages to consumers, most mills in the Chicago area were forced to take into account carry-overs of at least a month or more. Some users appear unhappy because their shipments can't be increased.

One large producer which regards itself out of the market for the remainder of the year reports that only in a few cases has it not received full specifications from customers on such tonnage as it will be able to supply in fourth quarter. This tight situation applies not only to hot and cold-rolled sheets but to galvanized and specialties as well. Most makers of silicon sheets and enameling stock haven't any tonnage left for the remainder of the year.

The situation in galvanized is just about as tight, and threatening to make galvanized supply still tighter is the government request for bids (Aug. 5) on 11,000 of 14,000 new grain bins. Steel for these would command priority.

Stainless steel strip sellers are booked into October, but they can make better deliveries on stainless sheets—four to six weeks.

Narrow carbon strip, hot and cold rolled, is in tighter supply. At least one large producer has nothing to offer before November shipment, promises having jumped from around early September almost overnight.

Sheet demand from builders of railroad equipment, now sharply on the upswing, is posing special problems. Ship steel demand prospects also are improving. Most tonnage for ships, of course, is plates and structurals, but heavier demand for plates may mean larger and longer plate runs on the continuous mills now largely devoted to sheet production.

With regard to shipbuilding, 144,610 tons of shipping were under construction in the U. S. in the quarter ending in June. This was an increase of 30,850 tons over that in the March quarter, and a substantial increase is indicated for coming months. In fact, the proposed shipbuilding program is expected to bring this country up among the leading shipbuilding nations.

A leading producer that early in July advanced its price on tight cooperage hoops from $4.475 to $5.325 base, last week cut back its increase to $4.75 for an increase of $5.50 per ton over the price in effect at the time of the initial change. Demand wouldn't support the higher price.

New England users of carbon sheets and specialties have some orders in for the remainder of this year with one month in the fourth quarter blanked out. Numerous users are asking for twice the tonnage ordered in second and third quarters, with duplicate inquiries increasing.

Steel Bars . . .

Bar Prices, Page 106

Producers of hot-rolled carbon bars are well behind on their commitments as they accept orders for the fourth quarter. Few, if any, will be able to take more than two months of tonnage for production and shipment in the closing months of the year.

In alloys, the situation is somewhat different. Most sellers of hot-rolled alloy bars are current on commitments and wide open for fourth quarter bookings. They can no longer book much tonnage for delivery before the fourth quarter, however, though they have plenty of capacity available for October, November and December.

This also is true in large measure with cold-finished carbon and alloy bars. Producers can accept orders for stainless bar shipments in four to six weeks.

Hot carbon bar production still is being retarded by a lack of steel. This, combined with continued strong demand, accounts for the extended deliveries on practically all sizes and shapes. Merchant bar promises are becoming more extended. One eastern seller is talking October on sizes 1¼-in. and under and has only limited tonnage available on the larger sizes for September shipment.

Some cold-finished bar mills are closed for vacations. This will put them two weeks farther behind schedule on back orders. Hot-rolled barmakers at Pittsburgh also are having trouble keeping up with orders; early third quarter customers will have to wait a week or two longer for deliveries.

As producers revise shipping schedules they report the possibility of a large carry-over of unfilled orders from third to fourth quarter. With some makers setting aside October to care for this overflow, fourth quarter promises to be unusually active.

Some contract machine shops on the West Coast are complaining that prime aircraft manufacturers are pulling more subcontracting work into their own shops, leaving the machine shops working at about 60 per cent of capacity. Missile work, however, is increasing rapidly.

The Air Force has ordered a step-up in production of two new supersonic jet fighter planes—the F-101 Voodoo produced by McDonnell Aircraft Corp. and the F-104, built by Lockheed. The Air Force has awarded Curtiss-Wright Corp. contracts involving an investment of $40,900,000 for J-65 jet engines and the Ford Motor Co. a $25,700,000 contract for J-57 jet engines.

Cold-drawn bar converters in New England are hampered by delayed shipments of hot-rolled stock. Several mills are booked through the fourth quarter on sheets and are holding off acceptances on hot-rolled bars. With schedules already tangled and at least one month due to be blanked out in the fourth quarter, more producers are booking new tonnage with caution. This has had an adverse effect on cold drawers. Replacement buying is heavier, with deliveries moving out. Most bar supply problems stem from lack of hot-rolled in competition with other products for available semifinished steel. Production of forged and screw machine products is increasing.

Plates . . .

Plate Prices, Page 106

Plates are becoming so tight with Chicago area mills that some makers consider them in the same stringency bracket as sheets. Every form of plate fabrication is pressing for more tonnage with slim prospects of getting it.

Plate demand is being augmented sharply by swelling freight car requirements. Latest awards in the East include 4000 for the Pennsylvania and 3500 for the Norfolk & Western. In addition, the Pennsylvania is stepping up its repairs from 100 to 175 cars daily.

Shipwork also is more promising, with the Maryland Shipbuilding & Dry Dock Co., Baltimore, apparently low on a Navy cargo ship. Its bids to the Maritime Commission were $10,218,398 on a fixed price basis, and $9,685,188 on an adjusted price basis.

The larger of the two mills of the Claymont, Del., plate producer will be down for a few weeks due to a cracked main housing. Operations on the smaller mill, which can handle thicknesses up to 2 in. and a plate up to 6600 lb, are being stepped up for rolling additional tonnage.

The two mills had been on an alternating schedule due to a shortage

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of ingots. Books of this producer had not been opened for September tonnage when the mill broke down on July 19.

Platemakers generally are booking fourth quarter tonnage, but on a restricted basis due to arrearages. In some cases, a month or more is being blanked out in the fourth quarter. In other instances, the tonnage available for the entire quarter is pared down on a monthly basis.

Railroad demand is bound to take up any slack that may develop from other consuming directions. Right now the roads are disappointed because they cannot obtain steel for their car programs more quickly. They are going ahead on later schedules than they had planned. Ship needs, for new construction and repairs, are gaining momentum.

Pittsburgh district mills report large volume inquiry for freight cars. The producers, however, have difficulty filling requests. Fabricators that order now for the third quarter are being disappointed. One major district producer is accepting no tonnage for shipment prior to October. Other area mills are taking orders for the middle of the fourth quarter, with some as much as five weeks behind schedule on shipments.

Many New England plate fabricators recognized the growing load on the plate mills too late. They are short of heavy sheared plates and are running into increased requirements from larger consumers for the fourth quarter, notably the railroads. Considerable carbuilding volume was placed, contingent on availability of plates in last quarter. The roads got the promise, but some of the promised tonnage will be at the expense of other buyers. Tank plate sizes and grades are not too far extended.

Consolidated Western Steel Division, U. S. Steel Corp., has been awarded 1000 tons of plates and an additional 1000 tons of miscellaneous steel items for the Mayfield dam at Tacoma, Wash.

Wire . . .

Wire Prices, Pages 108 & 109

Business in manufacturers wire is brisk. Delivery promises range from 10 to 12 weeks in some cases, and 11 to 13 weeks on the annealed and processed items.

Wire rod supply is reported extremely tight.

Deliveries on some merchant wire products range eight to ten weeks, but on bale ties and nails, three-to-four-week delivery is offered.

More fourth quarter volume is being placed in New England, notably grades for automobile and upholstery springs. For the most part, third quarter open capacity is in fine wire which has overexpanded capacity. Flat tempered steel stock is sold through November and more rod tonnage is being booked for the closing quarter.

The wire mills generally are not falling behind on shipments to the extent experienced in other finished steel products. This is attributed to earlier and continued selective scheduling.

Tool Steel . . .

Tool Steel Prices, Page 110

Jessop Steel Co., Washington, Pa., increased base prices and extras 5.8 per cent on saw steels used in the lumbering industry on July 22. Extras of less than 5 cents a pound were increased ½-cent per pound. For example, the base price on 0.70 per cent nickel saw steel was increased from 29 cents per pound to 30½-cents on circles of 0.090-in. gage and less. Circles of the same grade over 0.090-in. gage were increased from 35½ to 37½-cents per pound.

Revises Export Prices

United States Steel Export Co., New York, has revised its export prices on tight cooperage hoops to 5.18c, cold-finished bars to 6.34c—freight included to New York, Philadelphia, or Baltimore, effective July 22.

Structural Shapes . . .

Structural Shape Prices, Page 106

Structural shape supply, especially wide flange sections, is the tightest in many months. All producing mills are behind on shipping commitments. Some won't be able to get current before the end of the year, and then only by limiting acceptance of new tonnage.

Fabricators regard steel supply as their No. 1 problem. While orders momentarily are relatively light in the New York market, considerable work is under consideration. In addition to a heavy amount of bridge construction, there is a good diversity of other building, such as schools, apartments, office and commercial structures. Industrial building is on the light side, as has been the case for some time.

Construction firms are using up inventories quickly, and they're having difficulty replenishing supplies. There's much bridge building to be finished this year, and the trend among builders is to close down for two week vacations rather than work at half speed for four weeks.

Fabricating plants in the Pacific Northwest report their estimators busy figuring many new projects. Competition, however, is extremely keen.

Less tonnage is being estimated for fabrication in New England. The slack stems from a slump in new bridge inquiry, with orders booked for 60,000 tons for the Massachusetts turnpike. A substantial part of this tonnage is plain material, and it will reach fabricating shops at higher prices to meet firm contracts booked when steel prices were lower. Wide flange beams are most extended in deliveries with the mills steadily falling behind schedules. Heavy bookings of sheet and bearing piles have pushed shipments out five months. Larger fabricators are into January on deliveries against new contracts.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 106

Producers of reinforcing bars in the Pacific Northwest are operating steadily, with backlogs substantial and new inquiry developing in small lots. Awards last week exceeded 1000 tons. Prospects for the next 90 days are described as excellent, with several important projects still unplaced.

Award of 3450 tons of reinforcing to Steel Fabricators Inc. for Tacoma's Mayfield dam was reported last week, but the project is being delayed by litigation.

Tubular Goods . . .

Tubular Goods Prices, Page 110

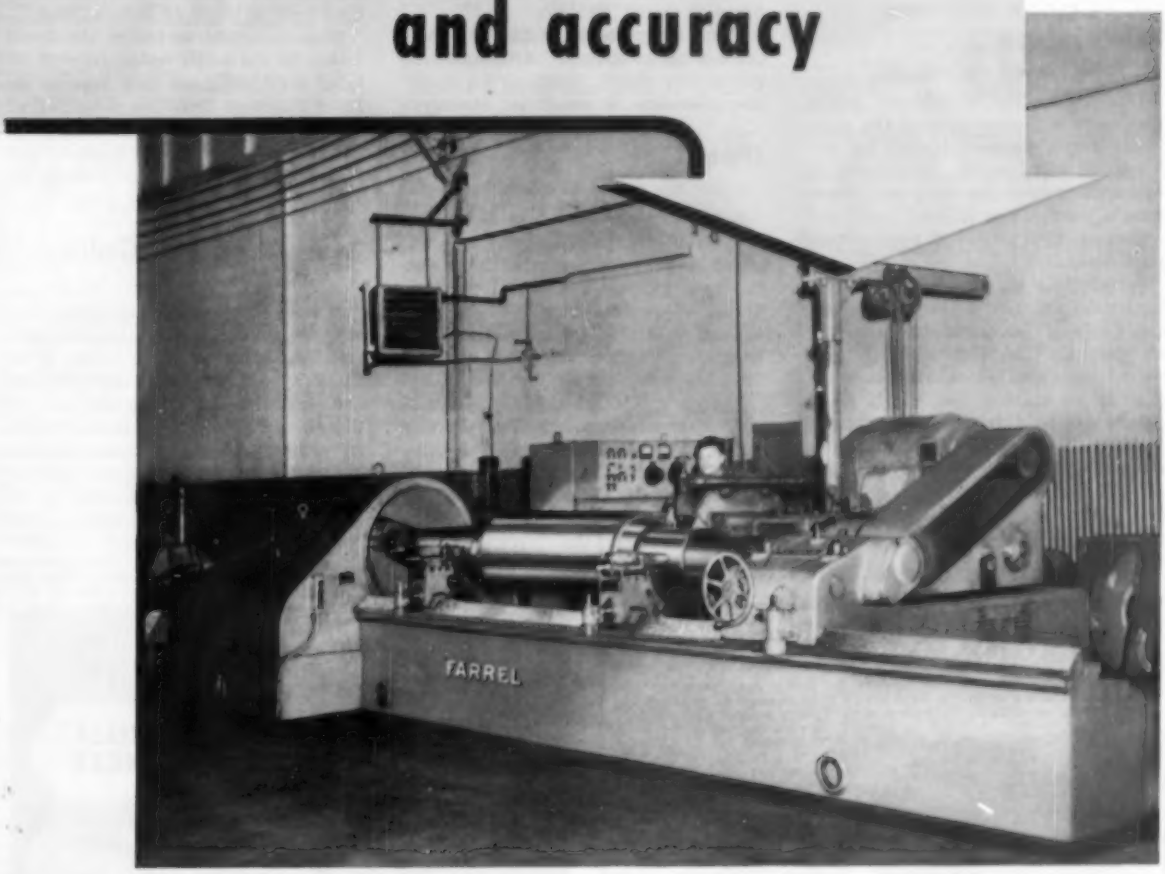
A $2-million modernization program at its seamless pipe mill in Welland, Ont., will be completed shortly by Page-Hersey Tubes Ltd., Canada's only producer of seamless pipe. When completed, the plant will turn out ½ to 7-in. seamless tubes. Seamless casing and oil and gas tubing also will supplement its line of resistance welded casing.

The only relatively soft spot in tubular goods sales is in electricweld tubing, Pittsburgh district mills report. But volume is described as fair. Other pipe products are selling well, including specialty tubing. It has been showing rapid improvement following dull demand in the early months of this year.

Jones & Laughlin Steel Corp. reports increasing demand for cold-drawn electricweld tubing with a mirrorlike inside finish. J. & L. adds it is producing tubing with an inside finish superior to many honed surfaces. The tubing is used in hydraulic and pressure cylinders.

The cast iron pipe market continues active with municipal requirements pressing tonnage on the pipe shops. Many projects involving less

How Detroit Steel gets roll grinding speed and accuracy



The 36" x 16'0 Farrel HD roll grinder above, in operation at the Portsmouth division of Detroit Steel Corporation, has shown its ability to cut roll grinding time substantially. This is true for both heavy roughing and fine finishing.

Rolls are obtained with a perfect surface, free from marks of any kind. Straight, convex or concave contours are ground to exact symmetry and accuracy.

Contributing to grinding accuracy is an automatic crowning device which grinds a mathematically accurate curve. Easily and quickly set, it requires no manipulation during operation. The same setting produces exactly the same curvature and permits fixed, uniform and easily controlled accuracy of contour in all rolls.

You, too, can step up your roll grinding speed and accuracy with a Farrel Heavy Duty machine. Available in six standard sizes. Write for descriptive bulletin.

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than 100 tons are included in sizable pending business in the Pacific Northwest. Sales and prospects indicate satisfactory last half volume.

The new pipe and conduit plant of the Canadian Western Pipe Mills Ltd., at Port Moody, near Vancouver, B. C., was formally opened recently, with 800 business, industrial and government leaders from western Europe, the United States and Canada in attendance.

Warehouse . . .

Warehouse Prices, Page 111

Due to higher warehouse prices (generally effective around the middle of July), business booked by distributors last month established a new dollar record for the year. There wasn't much of a decline from the peak month of June on even a tonnage basis.

Warehouses still are being pressed for tonnage by mill buyers, reflecting the oversold position of producers. All popular sizes are being shipped out as rapidly as received. Plates appear to be the tightest single item, closely followed by shapes and bars.

Although many small fabricators are closing down for vacations, there's no reduction in distributors' bookings. Trade interests expected a midsummer slowdown, especially in view of heavy consumer buying in the second quarter as protection against a long steel strike, but this has not materialized.

West Coast distributors say the posting of higher prices has not retarded sales. With construction active and general conditions favorable, they foresee continued good business during the balance of this year. Mills on the West Coast are in a position to make deliveries on practically all items in about 45 days.

Price competition in the Los Angeles area is keener, particularly in galvanized sheets. Demand for small diameter pipe is somewhat stronger.

Iron Ore . . .

Iron Ore Prices, Page 121

Lake Superior iron ore consumption declined slightly in June as compared with May, reports the Lake Superior Iron Ore Association. Use during the month was 7,472,578 tons against 7,797,744 in May. In June, 1954, consumption amounted to only 5,396,131.

The decline in June was due partly to the shorter month. There were fewer active blast furnaces in the period, however, 182 on July 1 against 186 on June 1. On July 1 a year ago active furnaces numbered 131. Twenty-three stacks were idle on July 1 as against 18 on June 1 and 72 on July 1 a year ago.

Cumulative consumption of ore to July 1 this year totaled 43,108,668 tons. In the first six months of last year, the figure was 34,772,756 tons.

Stocks of iron ore at lower lake docks and furnaces on July 1 amounted to 27,354,868 gross tons. This was an increase, compared with 21,900,527 tons on June 1, but is substantially under the 34,996,184 tons held in stock on July 1, 1954.

Shipments of iron ore on the Great Lakes in the week ended July 25 totaled 3,055,668 gross tons, reports the Lake Superior Iron Ore Association. This compares with movement of 2,350,032 tons in the like week of last year. Shipments for the season (to July 25) total 38,504,354 tons.

Metallurgical Coke . . .

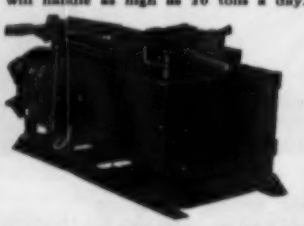
Metallurgical Coke Prices, Page 121

Foundry coke prices are higher. The advance is expected to become general. At Chicago oven coke is up $1.25 a net ton, the new Chicago oven price being $25.75 and the delivered price at that point $27.25. Other new prices are Indianapolis and Terre Haute (Ind.) ovens, $25.50; Milwaukee ovens, $26.25. This is the first increase in coke prices since November, 1952.

KARDONG CIRCLE BENDER

For Concrete Reinforcing Bars

This is a powerful and fast machine for heavy duty work in both fabricating plants or in the field where large tonnage is required. It will handle as high as 20 tons a day. Circles of any size required in concrete reinforcing work from 18 inches in diameter up can be bent on this machine. It will bend bars with two or more radii on the same bar without stopping the machine.



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Model "C" Capacity 1¼ inch
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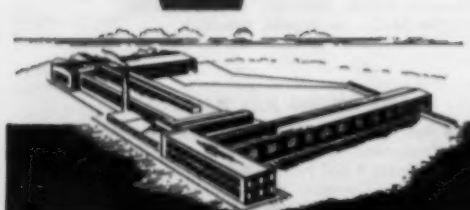


KEYSTONE DRAWN STEEL CO.
SPRING CITY PENNSYLVANIA

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.

(18 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $196 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.8c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P. 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 96.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grads, Si 16-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, C 0.025% max. (Simplex 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 16.35c per lb of alloy, ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 34.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50% carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max) $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.
Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.9c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c, ton lots 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.12c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.00, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 5% max, C 0.4% max). Contract, ton lot, 2" x D, $6.80-$6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max.) Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, deld.; less ton lots $4.70.

Silicas Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.50-0.75%). Carloads packed 1" x D, 43c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5.7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ¼" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy, ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

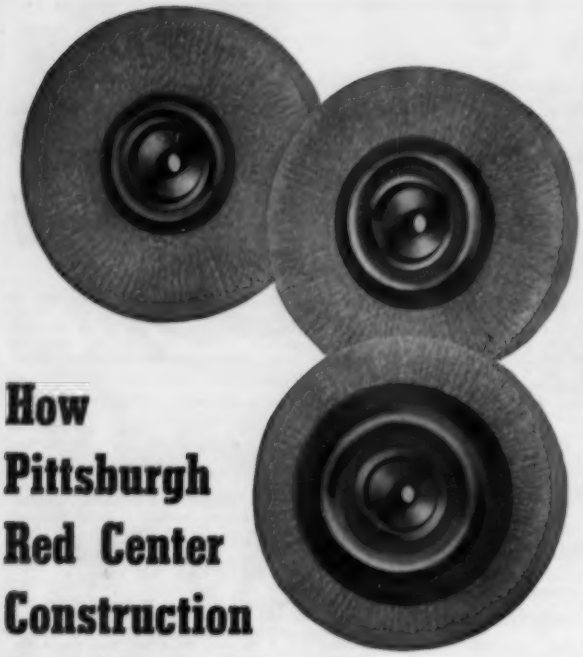
V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.16c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal, Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn. $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa. $1.24.



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In conventional brushes, when faster cutting action is desired, coarser wire is used. But increasing the wire gauge causes brittleness, destroying the wearing quality of the brush, and resulting in excessive scoring of the work.

Pittsburgh has solved this problem by maintaining the same ideal gauge wire in every brush, but increasing the fill and diameter of the hub and center plate of brushes designed for faster cutting. Thus, although cutting speed is increased, work remains unscored and the wire does not lose its inherent power to flex. These Red Center brushes last longer, maintain perfect balance throughout life, and do a better job all around.

This is just one example of superior Pittsburgh construction, engineered for both general and specific applications. For details of the complete line, write for free Catalog #54-W. Address: PITTSBURGH PLATE GLASS CO., *Brush Div.*, Dept. O-8, 3221 Frederick Ave., Baltimore 29, Maryland.

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Fifth Edition, 440 pages, Illustrated

This book brings together the combined knowledge and experience of 31 outstanding authorities and takes one step by step through steelmaking. Representing years and years of constant work and study, "ABC" is the result of actual first-hand experience. It is written in simple, non-technical language, and hundreds of photographs of operations and equipment are included. The Penton Publishing Co., Book Department, 1213 W. 3rd St., Cleveland 13, O.

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OVER 30 YEARS EXPERIENCE

Standard for Service and Durability. Ground to extremely close Tolerances and Finish. Made by *Toolmakers.*

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2086 W. 110th ST. CLEVELAND 2, OHIO

Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$31.50-$32.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 85c-87c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$52.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

56-60%	$3.50-$3.80
60-65%	3.80-4.25

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $124.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130; Philadelphia, $116; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienopis, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., $14.50; Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ¼-in. grains with fines: Chewelah, Wash., $38; Luning, Nev., $40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.50
Camden, N. J., ovens	24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	*25.75*
Chicago, deld.	*27.25*
Terre Haute, Ind., ovens	*25.50*
Milwaukee, ovens	*26.25*
Indianapolis, ovens	*25.50*
Cincinnati, deld.	*27.10*
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	24.00
Swedeland, Pa., ovens	24.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	24.25
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5¼	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25

CARBON

8	60	11.40
14, 12, 10	60	11.10
14	72	10.25
17	60	10.25
17	72	9.85
20	84	9.85
20	90	9.65
24	72, 84	9.85
24	96	9.60
30	84	9.75
40, 35	110	9.50
40	109	9.50

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METAL: Stainless steel 410 (AMS 5350).
PARTS: Designed and cast as a single unit.
QUALITY CONTROL: Produced under X-ray control. Chemical and physical affidavits furnished. Test bars submitted.
ADVANTAGES: Investment casting, by eliminating all finishing operations except reaming of cast hole through pivot boss, reduced cost from over $10.00 each to approximately $3.50 each.

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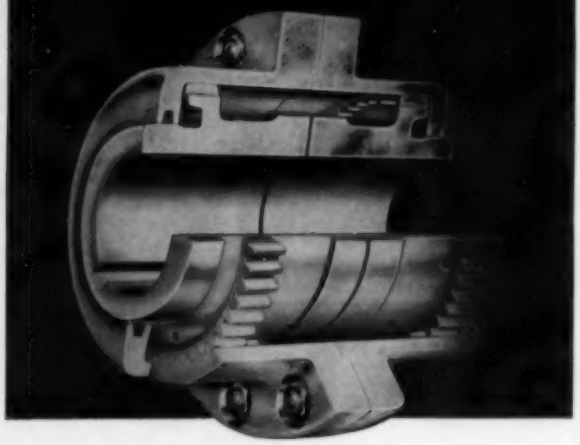

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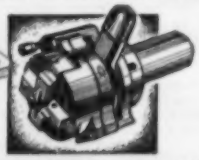

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Scrap . . .

Scrap Prices, Page 134

Philadelphia—Further increases are noted in steel scrap. No. 1 heavy melting, No. 1 bundles and No. 1 busheling are holding at $43, delivered; No. 2 heavy melting, regarded as the most scarce of all steel grades, is moving at $38, delivered. No. 2 bundles have advanced to $34-$35, delivered; electric furnace bundles, to $44.

Recent advances haven't greatly stimulated the intake at dealers' yards. This, combined with brisk trading, is keeping yard stocks of steel scrap at a minimum. Foreign inquiry is less pressing than a few weeks ago, but it is still a factor in keeping supply at low ebb.

New York—Scrap brokers have advanced buying prices on some of the major steel grades $1 to $1.50 a ton. They are offering $37.50-$38 for No. 1 heavy melting and No. 1 bundles and $33-$34 for No. 2 heavy melting. Borings and turnings, low phos and the cast grades are unchanged. Domestic consumers are active in the market, but foreign demand is off from what it was a few weeks ago.

Boston—The higher price for No. 1 heavy melting steel and bundles has pulled up No. 2 steel by $2.50 per ton and narrowed the differentials between the grades. No. 2 bundles, while 50 cents higher lags in the advance. Lighter industrial steel scrap advances are 50 cents to $2. The higher prices on steel scrap are not duplicated in the cast grades. Volume of the latter moving is light, with prices barely holding.

Pittsburgh—Trade sources say if mills entered the market now with large-scale orders, they would have to pay between $42 and $45 a ton to attract sizable amounts of No. 1 heavy melting scrap. Last orders were placed at $40 a ton. Brokers are paying $42 a ton; good scrap is scarce at that price.

Other grades of scrap, notably punchings and plate scrap, heavy turnings, electric furnace bundles and cut structurals, are showing greater strength, too. Cast iron grades average $1 a ton above last week.

Cleveland — Largely reflecting broker covering, the scrap market here continues to boil. Despite the absence of representative mill purchases of the steelmaking grades, dealers are marking their prices up $1 per ton in anticipation of a strong demand through the remainder of the year. The cast iron grades also are higher on improving foundry demand.

Buffalo — Although local scrap prices are unchanged, stronger tendencies prevail, with indications higher prices are in the offing. Dealers are finding it difficult to get material to meet shipments against old orders. New out-district buying is anticipated.

Chicago—The scrap market here continues to boil. Shortage of good material may be at the bottom of the situation, but if so, the fact isn't fully evident. Nor does the shortage of blast furnace hot metal seem a logical explanation for this district, with 40 of 43 blast furnaces operating. About the only certainty in the situation is that a good many brokers are obliged to fill old orders with high-priced material.

Detroit—The scrap market continues strong in this area, with most brokers and dealers short on their orders. No. 1 heavy melting is quoted at $34; No. 2 heavy melting, $24; No. 1 bundles, $35; No. 2 bundles, $24; No. 1 busheling, $34; short shovel turnings, $20; punchings and plate scrap, $42.

Birmingham—Scrap prices have finally started upward in this district, advancing from $1 to $3 on most items, with a jump of $6 per ton on No. 2 bundles. Brokers predict still higher prices in view of export quotations at some South Atlantic and

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 27	$42.00
July 20	40.17
June Avg.	35.44
July 1954	27.42
July 1950	37.04

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	*42.00**
No. 2 heavy melting	*39.00**
No. 1 bundles	*42.00**
No. 2 bundles	*36.00**
No. 1 busheling	*42.00**
Machine shop turnings	22.50-23.50
Mixed borings, turnings	22.50-23.50
Short shovel turnings	26.50-27.50
Cast iron borings	26.50-27.50
Cut structurals, 3 ft lengths	*43.00-44.00*
Heavy turnings	*39.00-40.00*
Punchings & plate scrap	*43.00-44.00*
Electric furnace bundles	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Charging box cast	*35.00-36.00*
Heavy breakable cast	*35.00-36.00*
Unstripped motor blocks	25.00-26.00
No. 1 machinery cast	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	42.50-43.50
Rails, 2 ft and under	49.50-50.50
Rails, 18 in. and under	50.50-51.50
Rails, random lengths	46.50-47.50
Railroad specialties	*48.00-49.00*

Stainless Steel Scrap

18-8 bundles & solids	255.00-265.00
18-8 turnings	110.00-120.00
430 bundles & solids	100.00-105.00
430 turnings	60.00-65.00

*Brokers' buying price

CLEVELAND

(Delivered consumers's plant)

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	33.00-33.00
No. 1 bundles	*39.00-40.00*
No. 2 bundles	29.00-30.00
No. 1 busheling	*39.00-40.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*26.00-27.00*
Short shovel turnings	*26.00-27.00*
Cast iron borings	*26.00-27.00*
Low phos.	*41.00-42.00*
Cut structural plates 2 ft and under	45.00-46.00
Alloy free, short shovel turnings	*31.00-32.00*
Electric furnace bundles	*41.00-42.00*

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Charging box cast	*40.00-41.00*
Stove plate	46.00-47.00
Heavy breakable cast	*36.00-37.00*
Unstripped motor blocks	*28.00-29.00*
Brake shoes	*35.00-36.00*
Clean auto cast	47.00-48.00
Burnt cast	*36.00-37.00*
Drop broken machinery	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*
R.R. malleable	48.00-49.00
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Rails, random lengths	*47.00-48.00*
Cast steel	*42.00-43.00*
Railroad specialties	*43.00-44.00*
Uncut tires	44.00-45.00
Angles, splice bars	*50.00-51.00*
Rails, rerolling	*57.00-58.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	250.00-260.00
18-8 turnings	120.00-130.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	35.00-36.00
No. 1 bundles	*41.00-42.00*
No. 2 bundles	32.00-33.00
No. 1 busheling	*41.00-42.00*
Machine shop turnings	*24.00-25.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Low phos.	*44.00-45.00*
Electric furnace bundles	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00-45.00*

CHICAGO

No. 1 heavy melting	*40.00-42.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 factory bundles	*42.00-43.00*
No. 1 dealer bundles	37.00-38.00
No. 2 bundles	31.00-32.00
No. 1 busheling	*40.00-42.00*
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*27.00-28.00*
Cast iron borings	*27.00-28.00*
Cut structurals, 3 ft	*43.00-44.00*
Punchings & plate scrap	*44.00-45.00*
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	35.00-37.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00-46.00*
R.R. malleable	49.00-50.00
Rails, 2 ft and under	*54.00-55.00*
Rails, 18 in. and under	*55.00-56.00*
Angles, splice bars	49.00-50.00
Rails, rerolling	*61.00-62.00*

Stainless Steel Scrap

18-8 bundles & solids	255.00-265.00
18-8 turnings	130.00-140.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange

(Week ended July 27)

	High	Low	Close
No. 1 Heavy Melting			
	High	Low	Close
Oct.	39.00	39.00	39.00
Jan.	....	....	....

Sales (160-ton units): 1 October.
*Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*34.00*
No. 2 heavy melting	*24.00*
No. 1 bundles	*35.00*
No. 2 bundles	*24.00*
No. 1 busheling	*34.00*
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Short shovel turnings	*20.00*
Punchings & plate scrap	*42.00*

Cast Iron Grades

Charging box cast	32.00
No. 1 cupola	39.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	42.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Cast iron borings	15.00-16.00
Short shovel turnings	24.00-25.00
Machine shop turnings	18.00-19.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	36.00-37.00
Structural plate, 2 ft	36.00-37.00
Unstripped motor blocks	35.50-36.50

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2 ft and under	44.00-45.00
Rails, 18 in. and under	45.00-46.00
Rails, rerolling	43.00-44.00
Rails, random lengths	40.00-41.00
Angles, splice bars	43.00-44.00
Std. steel axles	35.00-36.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	*43.00*
No. 2 heavy melting	*38.00*
No. 1 bundles	*43.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*43.00*
Electric furnace bundles	*44.00*
Machine shop turnings	*26.00*
Mixed borings, turnings	*26.00*
Short shovel turnings	*29.00*
Structurals & plate	45.00-46.00
Heavy turnings	*39.00*
Couplers, springs wheels	45.00-46.00
Rail crops, 2 ft under	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	36.00
Malleable	*46.00*
Heavy breakable cast	45.00
Drop broken machinery	45.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*37.50-38.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	*37.50-38.00*
No. 2 bundles	25.00-26.00
Machine shop turnings	16.00-17.00
Mixed borings, short turnings	17.00-18.00
Short shovel turnings	18.00-19.00
Low phos. (structural & plate)	38.00-39.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Unstripped motor blocks	22.00-23.00
Heavy breakable	35.00-36.00

Stainless Steel

18-8 sheets, clips, solids	245.00-250.00
18-8 borings, turnings	120.00-125.00
430 sheets, clips, solids	105.00-110.00
410 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*26.00-26.50*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*23.00-23.50*
Machine shop turnings	*15.00-15.50*
Mixed borings, turnings	*15.50-16.00*
Short shovel turnings	*17.50-18.00*
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	33.00-34.00

BUFFALO

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	26.00-27.00
No. 1 busheling	34.00-35.00
Mixed borings, turnings	23.00-24.00
Machine shop turnings	21.00-22.00
Short shovel turnings	24.00-25.00
Cast iron borings	23.00-24.00
Low phos.	37.00-38.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	42.00-43.00

Railroad Scrap

Rails, random lengths	39.00-40.00
Rails, 2 ft and under	44.00-45.00
Railroad specialties	39.00-40.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*37.50-38.50*
No. 2 heavy melting	*32.50-33.50*
No. 1 bundles	*37.50-38.50*
No. 2 bundles	*28.50-29.50*
No. 1 busheling	*37.50-38.50*
Machine shop turnings	20.00-21.00
Mixed borings, turnings	19.50-20.50
Short shovel turnings	*24.00-25.00*
Cast iron borings	*21.00-22.00*
Low phos., 18 in.	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Heavy breakable cast	*38.00-39.00*
Charging box cast	*36.00-37.00*
Drop broken machinery	*45.00-49.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00†*
Rails, 18 in. and under	*51.00-52.00*
Rails, random lengths	*44.00-45.00*

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.50
Machine shop turnings	18.00
Short shovel turnings	20.00

Cast Iron Grades

No. 1 cupola	41.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	*35.00*
Brake shoes	*33.00*
Clean auto cast	*44.00*
Stove plate	34.00

Railroad Scrap

No. 1 R.R. heavy melt.	*41.00*
Rails, 18 in. and under	*50.00*
Rails, random lengths	45.00
Rails, rerolling	*58.00*
Angles, splice bars	*43.00*

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	25.00
No. 2 bundles	23.00
No. 3 bundles	16.00-17.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	39.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	36.00-40.00
Heavy breakable cast	28.00
Unstripped motor blocks	30.00-32.00
No. 1 wheels	24.00-25.00
Stove plate (f.o.b. plant)	28.00-29.00
Brake shoes	28.00-29.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths	34.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
Machine shop turnings	10.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 1 busheling	32.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	14.00
Cast iron borings	14.00
Cut structurals	34.00
Heavy turnings	12.00
Punchings & plate scrap	32.00

Cast Iron Grades

No. 1 cupola	40.00-43.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Mixed borings, turnings	16.00
Rails, remelting	43.00
Busheling, new factory: Prepared	32.00
Unprepared	28.00
Short steel turnings	16.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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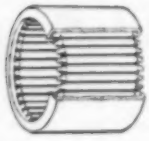
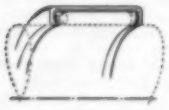
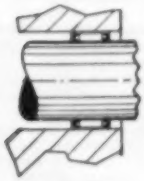


Unique construction—accurately drawn, surface-hardened shell retains rollers and serves as outer raceway.

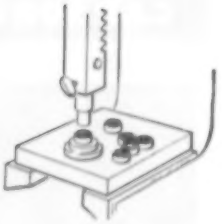
Full complement of small diameter rollers—precision-ground and through-hardened—assures top capacity by distributing load over large number of contacts.



Turned-in lips of the case-hardened outer shell keep dirt and grit out, lubricants in—while retaining trunnion ends of rollers. All wear surfaces of outer race are case-hardened.



No inner race required on surface-hardened shafts—reduces space requirements, lowers unit costs.



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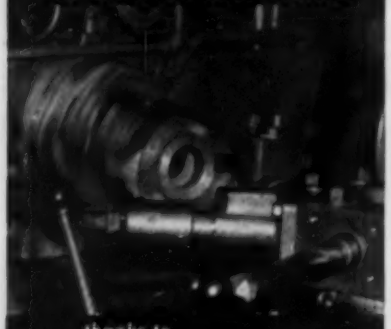

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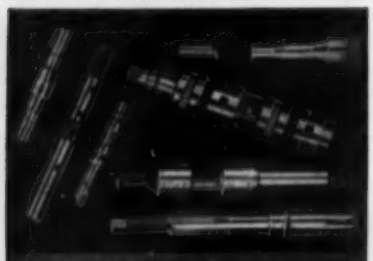

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Gulf ports, where exporters are offering $36 for No. 1 heavy melting, $34 for No. 2 heavy melting and up to $30 for No. 2 bundles. Cast iron prices also are up $1 a ton, with foundries placing sizable orders for No. 1 and stove plate.

St. Louis—Scrap prices continue strong. Supplies are dwindling. Vacation shutdowns steadily trim industrial scrap tonnage. Country shippers and dealers report their intake is less than usual this season because of farm activity and heat.

Railroad grades, especially rerollers, are in sharp demand, but offerings remain low. Four mills split up a 50-car offering last week to prevent skyrocketing prices.

Seattle—The scrap market is firm here, with No. 1 and No. 2 heavy melting steel holding steady at $33 and $29, respectively. Exports are providing strong support. Receipts are heavy, allowing some surplus for export.

Los Angeles—For the second consecutive month, scrap exports were heavy in July. At least three cargoes were shipped to Japan from the Los Angeles port. The big export push is expected to continue into August.

Pig Iron . . .

Pig Iron Prices, Page 111

Pig iron demand continues active and is expected to come close to equaling the May volume this month. Prospects are that September volume will be fully abreast of it. June and July registered declines because of foundry closings for vacations.

Merchant pig iron sellers in the Cleveland district are booking much larger volume of business this summer than they had anticipated. They expect demand to be heavy well into the fourth quarter, especially with scrap prices rising steadily in recent weeks.

Keokuk Electro-Metals Co. increased all grades of electric furnace silvery pig iron $2.50 a gross ton, f.o.b. Keokuk, Iowa, effective July 25.

There is no shortage of iron, blast furnace capacity being adequate to accommodate all anticipated needs. Blast furnaces operated at 94.7 per cent in June and 90 per cent in the first half of the year.

Production of pig iron came to 6,495,050 net tons in June and 37,168,706 tons in the first six months, while output of ferromanganese and spiegeleisen came to 48,828 tons in June and 315,719 tons in the first half.

Total blast furnace output of 6,543,878 tons in June compared with 4,724,150 tons in the like 1954 period; 37,484,425 tons in the first six months of this year compared with 29,191,682 in the like period a year ago.

The bulk of iron consumers in New England are paying the lowest price for tonnage in the East, with the exception of those buying basic from the Chester, Pa., furnace. Mystic Furnace, under its mutual agreement contracts, did not advance $2.50 a ton. Thus, the equalization point with Buffalo and Troy, N. Y., has broadened for the Everett, Mass., producer. The last named has a substantial stockpile, reducing production to the lowest draft point and still continue in blast.

Rails, Cars . . .

Track Material Prices, Page 109

Orders for 800 steel boxcars have been placed with the Bessemer, Ala., plant of Pullman-Standard Car Mfg. Co. by the Central of Georgia Railway and its affiliate, Savannah & Atlantic Railway. Order exceeds $5,500,000.

The Rutland Railroad, which in June a year ago ordered its first new freight equipment in 30 years, last week stepped up its rehabilitation program by ordering 100 fifty-ton 40-ft-6-in. boxcars from Pullman-Standard Car Mfg. Co., Chicago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2400 tons, paper mill addition, Calhoun, Tenn., Bowaters Southern Paper Corp., to Bristol Steel & Iron Works Inc., Bristol, Va.

1700 tons, plant addition, Parish Pressed Steel Co., Reading, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

1010 tons, ten-story office building, Fulton County Federal Savings & Loan Association, Atlanta, Ga., to Bristol Steel & Iron Works Inc., Bristol, Va., through J. A. Jones Construction Co.

1000 tons, Mayfield dam, Tacoma, Wash., to Consolidated Western Steel Corp., Seattle (project in litigation).

1000 tons, state turnpike bridgework, section 36-G, Carbon county, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

500 tons, plant at Antioch, Calif., for the DuPont interests, to Consolidated Western Steel Division, U. S. Steel Corp., Pittsburgh.

450 tons, TWA hangar, Philadelphia Municipal Airport, through Baton Construction Co., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

450 tons, senior high school, New Canaan, Conn., to Schacht Steel Construction Inc., New York.

420 tons, buildings, airport, Prince George, Md., to Allied Structural Steel Co., Dover, Del.

300 tons, Seward terminal, Alaska railroad, to Isaacson Iron Works, Seattle; Mannix & Stolte, general contractor.

300 tons, plant addition, Armco Steel Corp., Ashland, Ky., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

250 tons, public school, Topton, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

200 tons, Navy hangar, Klamath Falls, Oreg., to Isaacson Iron Works, Seattle; D. M. Drake Co., Portland, Oreg., general contractor.

175 tons, DuPont expansion, Henry Clay, Del., to Bethlehem Fabricators, Bethlehem, Pa.

170 tons, parking facility No. 2, Orlando Parking Commission, Orlando, Fla., to Bristol Steel & Iron Works Inc., Bristol Va., through Paul Smith Construction Co.

135 tons, 3-span stringer bridge, Manchester, N. H., to Bancroft & Martin Rolling Mills

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Co., South Portland, Me.; Manchester Sand & Gravel Co., Manchester, general contractor.

100 tons, W-F beam bridge, Albany, N. Y., to Vermont Structural Steel Co., Burlington, Vt.; Olson Construction Co., Montpelier, Vt., general contractor.

100 tons, turnpike bridgework, section 36-H, Carbon county, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

100 tons, DuPont expansion, Seaford, Del., to Belmont Iron Works, Eddystone, Pa.

50 tons, Woodrow Wilson High School, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Mortensen Construction Co., Seattle, general contractor.

STRUCTURAL STEEL PENDING

4000 tons, DeKalb avenue subway reconstruction, Board of Transportation, New York, bids Aug. 26.

1650 tons, state bridgework, Philadelphia county, Pa.; bids Aug. 26. Also required are 207 tons of reinforcing steel.

1500 tons, widening of two state bridges, Allegheny county, Pa.; bids Aug. 12.

1280 tons, municipal bridge over the Schuylkill river, city line, Philadelphia; bids closed by Department of Streets, Aug. 26.

286 tons, state bridgework, Butler county, Pa.; bids Aug. 26.

100 tons, I-beam bridge, Conway, Vt.; bids in to Montpelier, Vt.

Unstated, four structures, towers, mess hall, quarters, etc., Glasgow, Mont., Air Base; bids to U. S. Engineer, Walla Walla, Wash., Aug. 17.

REINFORCING BARS . . .

REINFORCING BARS PLACED

2450 tons, Mayfield dam, Tacoma, Wash., to Steel Fabricators Inc., Seattle; Arundel & Dixon, San Gabriel, Calif., general contractor (project in litigation).

485 tons, Seward terminal, Alaska railroad, to Bethlehem Pacific Coast Steel Corp.; Mannix & Stolte, general contractor.

308 tons, Pacific Telephone & Telegraph Co., dial telephone building, Seattle, to Bethlehem Pacific Coast Steel Corp.; Henrik Valles Inc., Seattle, general contractor.

260 tons, viaduct and bridges, Waterbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Mariani Construction Co., New Haven, general contractor.

230 tons, treatment plant, Southwest Seattle District, to Steel Fabricators Inc., Seattle; Noble W. White, Seattle, general contractor at $539,362.

175 tons, three composite beam bridges with skew spans, Derby-Ansonia, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Jarvis Construction Co., Manchester, Conn., general contractor.

118 tons, Washington state road project, King county, to Bethlehem Pacific Coast Steel Corp., Seattle; A. J. Cheff Construction Co., Seattle, general contractor.

88 tons, post exchange, Ft. Richardson, Alaska,

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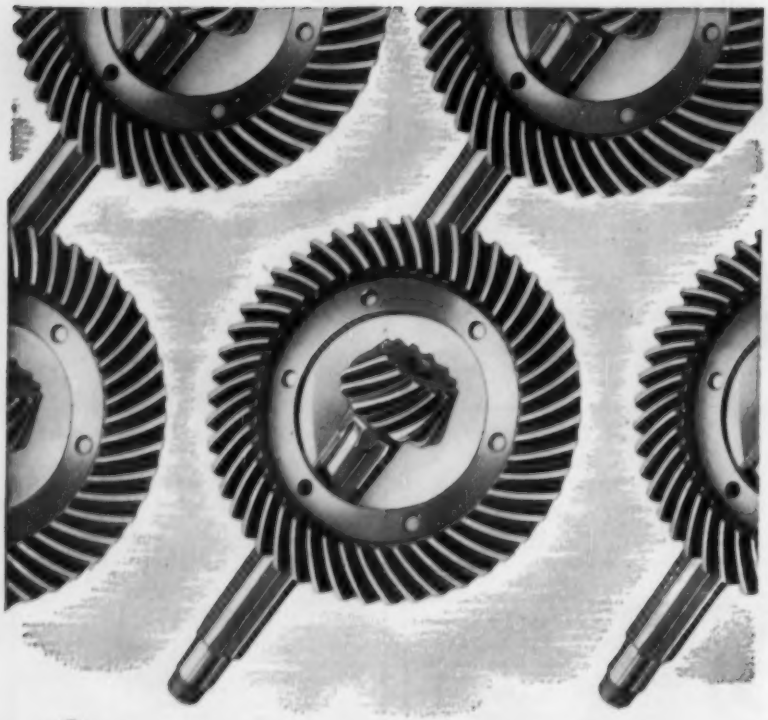

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REINFORCING BARS PENDING

300 tons, including shapes, Idaho state, Ada county, 447-ft highway bridge; bids to Boise, Idaho, July 26.

207 tons, state bridgework, Philadelphia county, Pa.; bids Aug. 26.

117 tons, including 55 tons of shapes, Washington state, Benton county project; Lewis Hopkins Co., Pasco, Wash., awarded at $93,787.

100 tons plus, Montana state highway projects: 608-ft Missouri river span; 152 and 120-ft spans, Valley county; 120-ft bridge, Gallatin county; bids to Helena, Mont., July 27.

PLATES . . .

PLATES PLACED

4400 tons, sheet and H-piling for Seward terminal Alaska railroad; general contract to Mannix & Stolte; piling government-furnished; to Columbia-Geneva Steel Division, U. S. Steel Corp.

2300 tons, Navy Purchasing Office, Washington, to Central Iron & Steel Co., Harrisburg, Pa.

1000 tons, Mayfield dam, Tacoma, Wash., to Consolidated Western Steel Corp., Seattle (in litigation).

513 tons, steel pipe, Hanford Works project, to Consolidated Western Steel Corp., Seattle; Harold Kaeser Co., Seattle, general award at $165,250.

275 tons, two elevated steel water tanks, Newton Centre, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

PLATES PENDING

125 tons, 200,000-gal elevated water tank, veterans' hospital, Excelsior Springs, Mo.; bids Aug. 30, Veterans' Administration, Washington.

100 tons or more, three storage tanks, 25,000 bbl capacity each, for jet fuel, King Salmon Alaska Base; bids to U. S. Engineer, Anchorage, Alaska, Aug. 18.

RAILS, CARS . . .

LOCOMOTIVES PLACED

New York Central, 61 diesel locomotives, to the Electro-Motive Division, General Motors Corp., LaGrange, Ill.; forty-five are general-purpose diesels of 1750-hp available for both road and switching service and 16 yard switchers of 900-hp.

LOCOMOTIVES PENDING

New York, New Haven & Hartford, ten 1200-hp diesel-electric switch engines, program authorized.

RAILROAD CARS PLACED

Central of Georgia, 800 steel boxcars to the Bessemer, Ala., plant of the Pullman-Standard Car Mfg. Co. The order is to be completed in the second quarter of 1956.

Pennsylvania, 4000 freight cars as follows: 1200 seventy-ton hopper cars to Bethlehem Steel Co.; 800 seventy-ton hopper cars to ACF Industries Inc.; 1000 boxcars, 500 seventy-ton flat cars and 100 seventy-ton gondola cars to its own shops at Altoona, Pa.; 400 seventy-ton covered hopper cars to the Pullman-Standard Car Mfg. Co.

New York Central, 3000 fifty-ton box cars, to its Despatch Shops, East Rochester, N. Y.; through typographical error this award was reported last week as involving only 300 cars.

Chicago & North Western, 2075 freight cars, with 1675 fifty-ton boxcars, going to the Michigan City, Ind., plant of the Pullman-Standard Car Mfg. Co., Chicago, and 500 gondola cars going to the East Chicago plant of the General American Transportation Corp., Chicago.

Canadian National, 1950 freight cars, awarded as follows: 1000 boxcars, Eastern Car Co., Ltd.; 500 boxcars and 200 gondola cars, Canadian Car & Foundry Co., and 250 boxcars, National Steel Car Corp., Ltd.

Norfolk & Western, 3500 cars, to ACF Industries Inc., New York. List comprises 1500 coal cars, 1500 hopper cars and 500 gondolas.

RAILROAD CARS PENDING

New York, New Haven & Hartford, 500 all-steel boxcars, program authorized.

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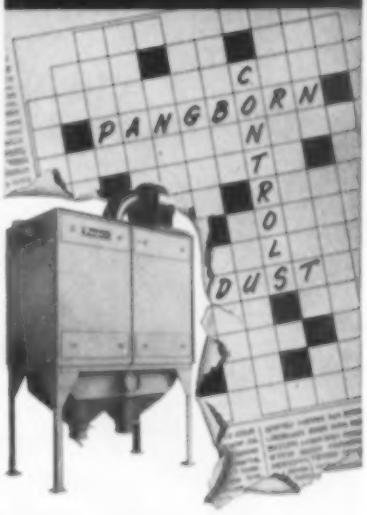
PUZZLED by a dust problem?



Pangborn can solve it for you!

Pangborn Unit Dust Collectors give thorough, efficient dust control at any individual operation. Requiring little floor space, they can be located anywhere. Use the Pangborn Dust Collector to:

- **Reclaim valuable material**
- **Reduce dust damage to expensive machinery and finished products**
- **Cut plant housekeeping costs**
- **Speed production — improve working conditions**

Investigate Pangborn Unit Dust Collectors now! Shipped assembled ... $545 and up. For details, write to: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn
CONTROLS DUST

"We need BIG Stainless Castings"

"Our Stainless Castings are Special"

"BIG"–"SPECIAL"–"TINY"–"INTRICATE"...

We can handle any job you have

Write for your copy: "ALLEGHENY METAL CASTINGS"

32 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

ADDRESS DEPT. S-68

Our Buffalo Foundry produces high-alloy steel castings *exclusively* . . . principally for corrosion and heat resisting applications. We've had long and valuable experience (as a pioneer in both vertical-centrifugal and static stainless casting methods) with practically every type of service condition you can name, and we'll welcome the opportunity to take on any stainless, high-temperature or high-strength casting problems you have.

And not just as a matter of meeting the service conditions, either. We're ready to handle any special shape or difficult-to-cast section your job may require . . . and any size of casting from a few ounces to several tons.

● *Let us quote on your requirements.* You'll find Allegheny Metal castings unsurpassed for soundness, clean-grained strength and easy machining qualities. Uniform, too, and reliable in supply. *Allegheny Ludlum Steel Corporation, Henry W. Oliver Building, Pittsburgh 22, Pennsylvania.*

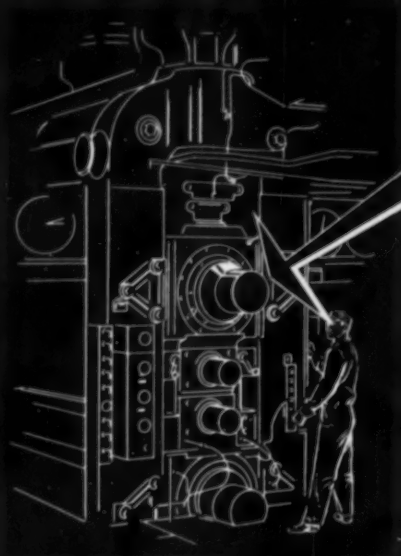
You can make it **BETTER** with

Allegheny Metal

AL TIME-TESTED STAINLESS STEEL

WAR BOOK Warehouse stocks carried by all Ryerson Steel plants

More shaft mileage!



SEALS LONGER, SAVES EXPENSIVE ROLL-NECK RE-GRINDING

Right this minute this seal is saving money in steel mills. Installed on hot mill rolls, C/R's new Type HMS Oil Seals exclude water and foreign matter from expensive bearings, prevent oil leakage and seal dependably with longer service life than ever before. Most important, the Sirvene (synthetic rubber) sealing elements are especially designed and compounded to reduce shaft wear. Tests by users confirm the success of this design. They report little or no shaft scoring with the new Type HMS seals. This means less downtime to re-metalize and re-grind roll necks . . . big savings in maintenance costs.

Your costs can be lowered, too, with the right C/R Oil Seal. Chicago Rawhide's unmatched engineering experience and production facilities are at your service. Please write or phone about your sealing problem. Offices in principal cities.

C/R

PERFECT
Oil Seals

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device

CHICAGO RAWHIDE MANUFACTURING COMPANY

1301 Elston Avenue OIL SEAL DIVISION Chicago 22, Illinois

IN CANADA: MANUFACTURED AND DISTRIBUTED BY SUPER OIL SEAL MFG. CO., LTD., HAMILTON, ONTARIO
EXPORT SALES: GEON INTERNATIONAL CORP., GREAT NECK, NEW YORK

Other **C/R** *products*

SIRVENE: (Synthetic rubber) diaphragms, boots, gaskets and similar parts for critical operating conditions • CONPOR: Controlled porosity mechanical leather packings and other sealing products • SIRVIS: Mechanical leather boots, gaskets, packings and related products.

Why TIMKEN® thrust bearings last longer

WHEN steel meets mandrel in the piercing mill at Youngstown Sheet and Tube Company's Campbell Works, the steel has to give. A Timken® thrust bearing takes the terrific pressure that's exerted on the mandrel. And Timken bearings in these thrust blocks can take it as proven by 20 years of continued use.

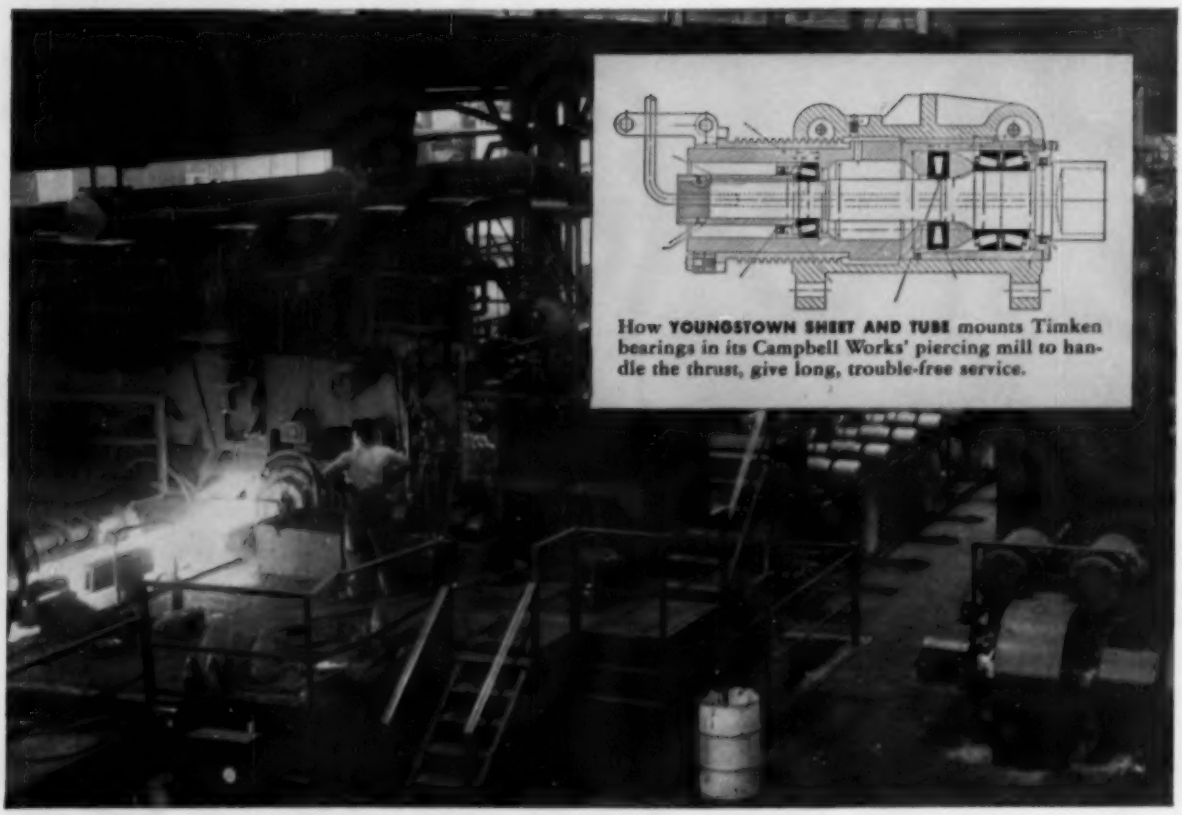
Full line contact between rollers and races is one reason Timken bearings stand up so well on this punishing job. It gives Timken bearings extra load-carrying capacity.

Another reason Timken bearings last and last is because rollers and races are case-hardened. This gives Timken bearings a hard, wear-resistant surface over a tough, shock-resistant core. And wear is reduced because the true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction.

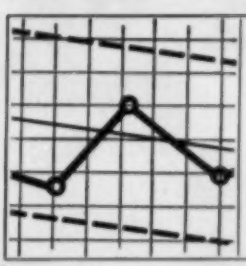
Other Timken bearings in this application (see diagram) help handle some of the thrust. That's because the tapered design of Timken bearings enables them to take *any* combination of radial and thrust loads.

To get these advantages in the equipment you build or buy, always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Canadian plant: St. Thomas, Ontario.

This symbol on a product means its bearings are the best.



How **YOUNGSTOWN SHEET AND TUBE** mounts Timken bearings in its Campbell Works' piercing mill to handle the thrust, give long, trouble-free service.



STATISTICAL QUALITY CONTROL

To insure uniform high quality and closer tolerances, the Timken Company uses statistical quality control. With it, tolerance deviations are plotted graphically. It's one of industry's newest, most scientific methods of improving product uniformity.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST →▯← LOADS OR ANY COMBINATION ✳